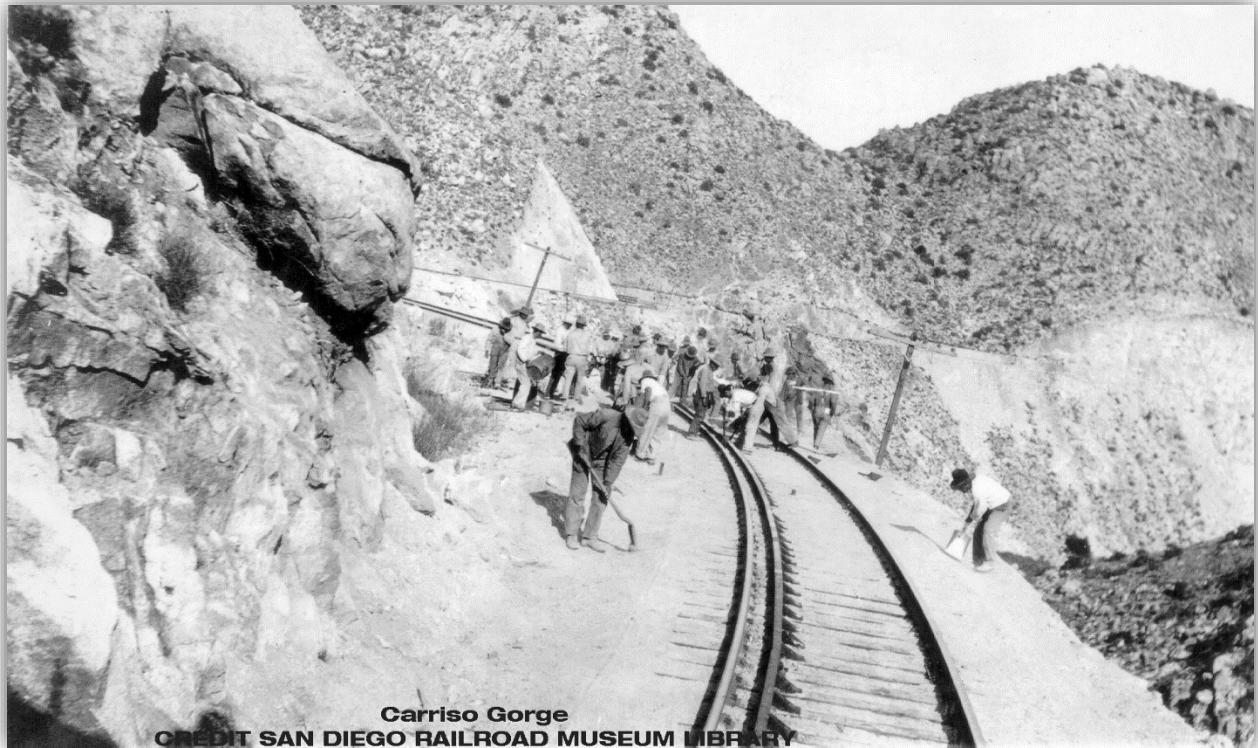


# IMPERIAL COUNTY AIR POLLUTION CONTROL DISTRICT



<https://www.psrn.org/about-us/sda/>

## **January 20, 2018 Exceptional Event Documentation For the Imperial County PM<sub>10</sub> Nonattainment Area**

An exceedance of the National Ambient Air Quality Standard (NAAQS) for PM<sub>10</sub> at the Brawley and Calexico monitors in Imperial County, California on January 20, 2018

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**ACRONYM DESCRIPTIONS**

AOD	Aerosol Optical Depth
AQI	Air Quality Index
AQS	Air Quality System
BACM	Best Available Control Measures
BAM 1020	Beta Attenuation Monitor Model 1020
BLM	United States Bureau of Land Management
BP	United States Border Patrol
CAA	Clean Air Act
CARB	California Air Resources Board
CMP	Conservation Management Practice
DCP	Dust Control Plan
DPR	California Department of Parks and Recreation
EER	Exceptional Events Rule
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
GOES-W/E	Geostationary Operational Environmental Satellite (West/East)
HC	Historical Concentrations
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
ICAPCD	Imperial County Air Pollution Control District
INPEE	Initial Notification of a Potential Exceptional Event
ITCZ	Inter Tropical Convergence Zone
KBLH	Blythe Airport
KCZZ	Campo Airport
KIPL	Imperial County Airport
KNJK	El Centro Naval Air Station
KNYL/MCAS	Yuma Marine Corps Air Station
KPSP	Palm Springs International Airport
KTRM	Jacqueline Cochran Regional Airport (aka Desert Resorts Rgnl Airport)
PST	Local Standard Time
MMML/MXL	Mexicali, Mexico Airport
MODIS	Moderate Resolution Imaging Spectroradiometer
MPH	Miles Per Hour
MST	Mountain Standard Time
NAAQS	National Ambient Air Quality Standard
NCAR	National Center for Atmospheric Research
NCEI	National Centers for Environmental Information
NEAP	Natural Events Action Plan
NEXRAD	Next-Generation Radar

NOAA	National Oceanic and Atmospheric Administration
nRCP	Not Reasonably Controllable or Preventable
NWS	National Weather Service
PDT	Pacific Daylight Time
PM <sub>10</sub>	Particulate Matter less than 10 microns
PM <sub>2.5</sub>	Particulate Matter less than 2.5 microns
PST	Pacific Standard Time
QA/QC	Quality Assured and Quality Controlled
QCLCD	Quality Controlled Local Climatology Data
RACM	Reasonable Available Control Measure
RAWS	Remote Automated Weather Station
SIP	State Implementation Plan
SLAMS	State Local Ambient Air Monitoring Station
SMP	Smoke Management Plan
SSI	Size-Selective Inlet
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTC	Coordinated Universal Time
WRCC	Western Regional Climate Center



## I Introduction

In 2007, the United States Environmental Protection Agency (US EPA) adopted the "Treatment of Data Influenced by Exceptional Events Rule" (EER)<sup>1</sup> to govern the review and handling of certain air quality monitoring data for which the normal planning and regulatory processes are not appropriate. Under the terms of the EER, the US EPA may exclude monitored exceedances of the National Ambient Air Quality Standard (NAAQS) if a State adequately demonstrates that an exceptional event caused the exceedance.

The 2016 revision to the EER added sections 40 CFR §50.1(j)-(r) [Definitions], 50.14(a)-(c) and 51.930(a)-(b) to 40 Code of Federal Regulations (CFR). These sections contain definitions, criteria for US EPA concurrence, procedural requirements and requirements for State demonstrations. The demonstration must satisfy all of the rule criteria for US EPA to concur with the requested exclusion of air quality data from regulatory decisions.

Title 40 CFR §50.14(c)(3)(iv) outlines the elements that a demonstration must include for air quality data to be excluded:

TABLE 1-1 TITLE 40 CFR §50.14(c)(3)(iv) CHECKLIST EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM <sub>10</sub> )			DOCUMENT SECTION
1	A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s)		Pg. 9
2	A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation		Pg. 19
3	Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section		Pg. 28
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable		Pg. 33
5	A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event		Pg. 40

<sup>1</sup> "Treatment of Data Influenced by Exceptional Events; Final Guidance", 81 FR 68216, October 2, 2016

Aside from the above, a State must demonstrate that it has met several procedural requirements during the demonstration process, including:

TABLE 1-2 PROCEDURAL CHECKLIST EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM <sub>10</sub> )		DOCUMENT SECTION
1	<b>Public Notification [40 CFR §50.14(c)(1)]</b> – In accordance with mitigation requirement at 40 CFR 51.930(a)(1), notification to the public promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard	Pg. 3 and Appendix C
2	<b>Initial Notification of Potential Exceptional Event [40 CFR §50.14(c)(2)]</b> - Submission to the Administrator of an Initial Notification of Potential Exceptional Event and flagging of the affected data in US EPA's Air Quality System (AQS) as described in 40 CFR §50.14(c)(2)(i),	Pg. 3
3	<b>Public Comment Process [40 CFR §50.14(c)(3)(v)]</b> - Documentation of fulfillment of the public comment process described in 40 CFR §50.14(c)(3)(v), and	Pg. 4 and Appendix C
4	<b>Mitigation of Exceptional Events [40 CFR §51.930]</b> - Implementation of any applicable mitigation requirements (Mitigation Plan) as described in 40 CFR §51.930	Pg. 4

The Imperial County Air Pollution Control District (ICAPCD) has been submitting criteria pollutant data since 1986 into the US EPA's Air Quality System (AQS). In Imperial County, prior to 2017, Particulate Matter Less Than 10 Microns (PM<sub>10</sub>) was measured by either Federal Reference Method (FRM) Size Selective Instruments (SSI) or Federal Equivalent Method (FEM) Beta Attenuation Monitor's, Model 1020 (BAM 1020). Effective 2017 Imperial County stopped utilizing FRM instruments relying solely on BAM 1020 monitors to measure PM<sub>10</sub>. It is important to note that the use of non-regulatory data within this document, typically continuous PM<sub>10</sub> data prior to 2013, measured in local conditions, does not cause or contribute to any significant differences in concentration difference or analysis.

As such, this report demonstrates that a naturally occurring event caused an exceedance observed on January 20, 2018 which elevated particulate matter within San Diego, Riverside and Imperial counties and affected air quality. The analyses contained in this report includes regulatory and non-regulatory data that provides support for the elements listed in **Table 1-1** and **Table 1-2**. This demonstration substantiates that this

event meets the definition of the US EPA Regulation for the Treatment of Data Influenced by Exceptional Events (EER)<sup>2</sup>.

### **I.1 Public Notification [40 CFR §50.14(c)(1)]**

The ICAPCD utilizes a web-based public notification process to alert the public of forecasted weather conditions and potential changes in ambient air concentrations that may affect the public. The ICAPCD identifies these public notifications as Advisory Events. On January 18, 2018 and January 20, 2018, the ICAPCD published advisories concerning the potential for elevated concentrations of particulate matter caused by gusty westerly winds preceding the passage of a low-pressure system commencing the evening of Friday, January 19, 2018 into Saturday, January 20, 2018. In addition to the gusty westerly winds the ICAPCD included other forecasted affects including an issued "Winter Weather Advisory," light rain and a drop in temperature. **Appendix C** contains copies of notices pertinent to the January 20, 2018 event.

### **I.2 Initial Notification of Potential Exceptional Event (INPEE) [40 CFR §50.14(c)(2)]**

When States intend to request the exclusion of one or more exceedances of a NAAQS as an exceptional event a notification to the Administrator is required. The notification process identified within the EER as the Initial Notification of Potential Exceptional Event (INPEE) is twofold: to determine whether identified data may affect a regulatory decision and whether a State should develop/submit an EE Demonstration.

On January 20, 2018, a naturally occurring event elevated particulate matter within San Diego, Riverside and Imperial counties, causing an exceedance at the Brawley monitor (06-025-0007) and the Calexico monitor (06-025-0005). Subsequently, the ICAPCD made a formal written request to the California Air Resources Board (CARB) to place preliminary flags on SLAMS measured PM<sub>10</sub> hourly concentrations from the Brawley and Calexico monitors on January 20, 2018. After review, CARB submitted the INPEE for the January 20, 2018 event in July of 2019. The submitted request included a brief description of the meteorological conditions for January 20, 2018 indicating that a potential natural event occurred. The ICAPCD has engaged in discussions with US EPA Region IX regarding the demonstration prior to formal submittal.

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<sup>2</sup> "Treatment of Data Influenced by Exceptional Events; Final Guidance", 81 FR 68216, October 2, 2016

**I.3 Public Comment Process [40 CFR §50.14(c)(3)(v)(A-C)]**

- (A)** The CARB and USEPA have reviewed and commented on the draft version of the January 20, 2018 exceptional event prepared by the ICAPCD. After addressing all substantive and non-substantive comments by both CARB and USEPA the ICAPCD has published a notice of availability in the Imperial Valley Press announcing a 30-day public review process. The published notice invites comments by the public regarding the request, by the ICAPCD, to exclude the measured concentrations of 163  $\mu\text{g}/\text{m}^3$  measured by the Brawley monitor and 225  $\mu\text{g}/\text{m}^3$  measured by the Calexico monitor on January 20, 2018.
- (B)** Concurrently with the Public Review period for the January 20, 2018 exceptional event, the ICAPCD is formally submitting to CARB for remittance to USEPA the Final January 20, 2018 exceptional event.
- (C)** Upon the ending of the review period the ICAPCD will remit to CARB and USEPA all comments received during the Public Review period along with a formal letter addressing any comments that dispute or contradict factual evidence in the demonstration.

The ICAPCD acknowledges that with the submittal to US EPA of the 2018 exceptional events, there is supporting evidence of documented recurring seasonal events that affect air quality in Imperial County.

**I.4 Mitigation of Exceptional Events [40 CFR §51.930]**

According to 40 CFR §51.930(b) all States having areas with historically documented or known seasonal events, three events or event seasons of the same type and pollutant that recur in a 3-year period, are required to develop and submit a mitigation plan to the US EPA.

The ICAPCD received notice from US EPA September 15, 2016 identifying Imperial County as an area required to develop and submit a mitigation plan within two years of the effective date, September 30, 2016, of the final published notification to states with areas subject to mitigation requirements. On September 21, 2018, after notice and opportunity for public comment the ICAPCD submitted the High Wind Exceptional Event Fugitive Dust Mitigation Plan (Mitigation Plan) for review and verification. Subsequently, on November 28, 2018 CARB received verification from US EPA of its review and approval of the Mitigation Plan. For a copy of the Mitigation Plan visit the Imperial County Air Pollution Control District website at <https://www.co.imperial.ca.us/AirPollution/otherpdfs/MitigationPlan.pdf>.

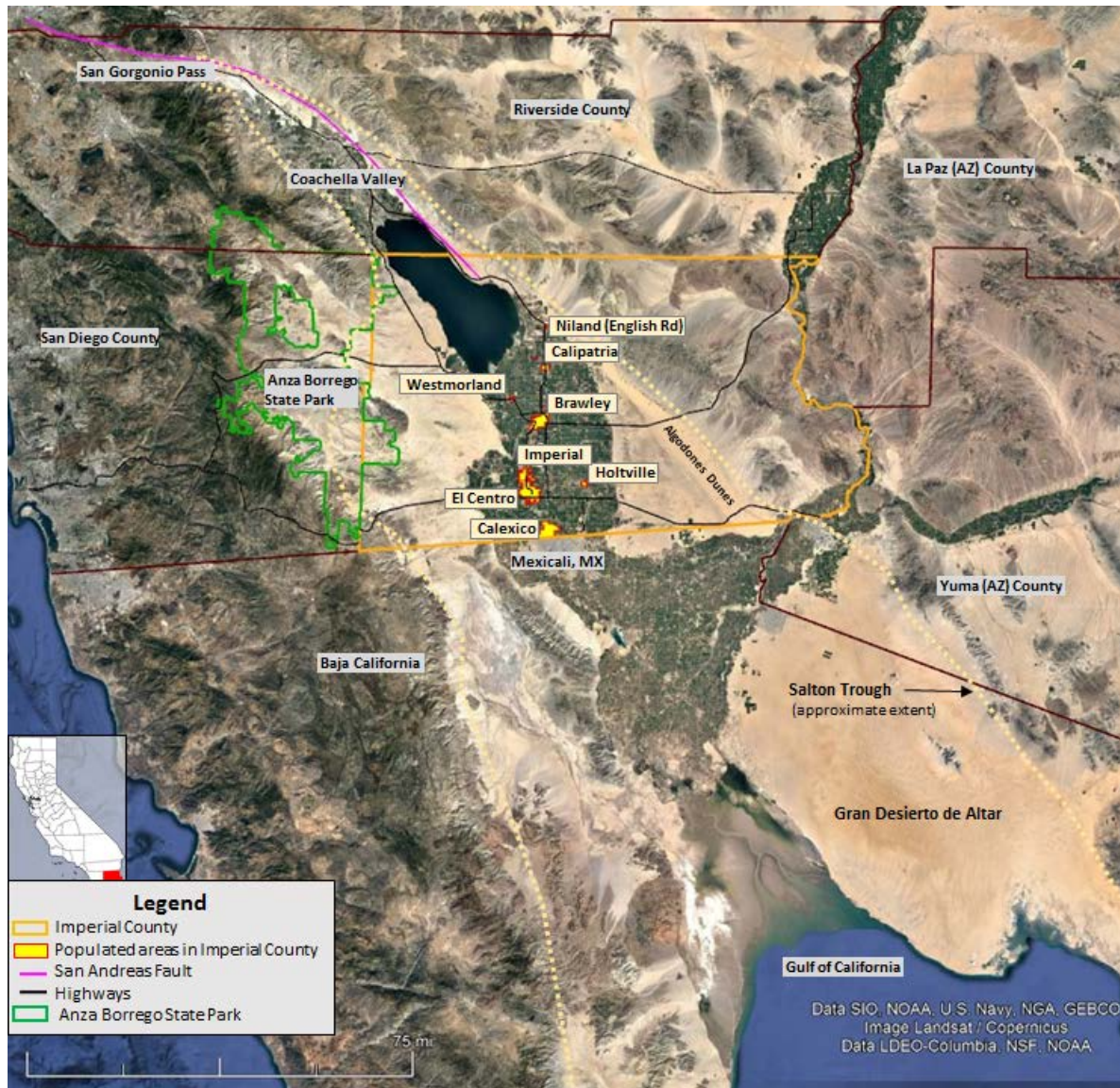
The Imperial County Mitigation Plan contains important geographical and meteorological descriptions, pages 3 through 6, of the areas within Imperial County and the surrounding areas that are sources of transported fugitive dust. **Figure 1-1** helps depict the geological aspects that are within Imperial County and outside of Imperial County that affect air quality.

Essentially, the Anza-Borrego Desert State Park, which lies in a unique geologic setting along the western margin of the Salton Trough, extends north from the Gulf of California (Baja California) to the San Geronio Pass and from the eastern rim of the Peninsular Ranges eastward to the San Andreas Fault zone along the far side of the Coachella Valley. These areas are sources of transported fugitive dust emissions into Imperial County when westerly winds funnel through the unique landforms causing in some cases wind tunnels that cause increase in wind speeds.

During the monsoonal season, natural open desert areas to the east, southeast, and south of Imperial County are sources of transported fugitive dust emissions when thunderstorms cause outflows to blow winds across natural open desert areas within Arizona and Mexico.



**FIGURE 1-1  
IMPERIAL COUNTY**



**Fig 1-1:** Imperial County a Southern California border region, within far southeast California bordering Arizona and Mexico has a small economically diverse region with a population of 174,528

Likewise, the Mitigation Plan contains a high wind event meteorological analysis broken down into four types of seasonal natural occurrences that cause elevated particulate matter that affects Imperial, San Diego, Riverside and Yuma Counties. The historical analysis has defined the meteorological events that lead to high winds and elevated PM<sub>10</sub> events in Imperial County, page 7, as follows:

- **Type 1:** Pacific storms and frontal passages;
- **Type 2:** Strong pressure and surface pressure gradients;
- **Type 3:** Monsoonal Gulf Surges from Mexico; thunderstorm downburst, outflow winds and gust fronts from thunderstorms
- **Type 4:** Santa Ana wind events

A complete description of these events begins on page 8 of the Mitigation Plan. While there is some overlap in discussed components between the Mitigation Plan and this demonstration such as the public notification process and the warning process, the Mitigation Plan does elaborate a little further. The Mitigation Plan discusses in detail the educational component, the notification component, the warning component and the implementation of existing mitigation measures, such as Regulation VIII.

Finally, the Mitigation Plan contains a complete description of the methods, processes and mechanisms used to minimize the public exposure, page 14, retain historical and real-time data, page 15, and the consultation process with other air quality managers to abate and minimize air impacts within Imperial County, page 16.

In all, the Mitigation Plan helps explain the recurring events, by type and influence upon Imperial County and provides supporting justification of a natural event.<sup>3</sup>

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<sup>3</sup> Title 40 Code of Federal Regulations §50.1 (k) defines a Natural Event as meaning an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.



**FIGURE 1-2**  
**MONITORING SITES IN AND AROUND IMPERIAL COUNTY**



**Fig 1-2:** Depicts a select group of PM<sub>10</sub> monitoring sites in Imperial County, eastern Riverside County, and southwestern Arizona (Yuma County). Generated through Google Earth



## **II Conceptual Model – A narrative that describes the event causing the exceedance and a discussion of how emissions from the event led to the exceedance at the affected monitor**

### **II.1 Description of the event causing the exceedance**

Days before and during Saturday, January 20, 2018 the National Weather Service (NWS) offices in Phoenix and San Diego issued Area Forecast Discussions describing an upper-level trough, off the Washington coast, with an associated cold front moving across the region.<sup>4</sup> The aforementioned low-pressure system, off the west coast, was forecasted to move inland through California during the evening hours of Friday, January 19, 2018 and into Arizona by Saturday, January 20, 2018 bringing stronger onshore flow with cooling, light rain and strong gusty westerly winds into the mountains and deserts.<sup>5</sup>

The strength of the winds produced by the weather system caused the NWS office to begin issuing Urgent Weather Messages advising the public of advisory level winds in excess of 25 mph and potential gusts at or above 45 mph along mountain ridgetops and deserts.<sup>6</sup> Wind advisories and Winter Weather advisories continued through Saturday, January 20, 2018.

Overall, the best description given of the event was provided by the Phoenix NWS office in one of its earlier Area Forecast Discussions. The event was described as a "...positively tilted Pacific trough..." moving inland into the Western States with "[i]ncreasing southerly flow ahead of the trough..." allowing for gusty winds to blow "...across southeast California and southwest Arizona by late Friday afternoon and into the evening hours."<sup>7</sup> **Appendix A** contains all pertinent NWS notices.

### **II.2 How emissions from the event led to an exceedance**

On January 20, 2018, the air monitors in Imperial, Riverside and Yuma counties measured elevated concentrations of particulate matter when a forecasted Pacific storm with an associated cold front brought gusty westerly winds across central and southern California. Strong gusty westerly winds, preceding the cold front, generated emissions from within the open mountain ranges and surrounding open natural deserts within San Diego and Imperial counties. These windblown dust emissions were transported into Imperial

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<sup>4</sup> National Weather Service, Area Forecast Discussion, Jan. 17, 2018, San Diego office, 952am PST

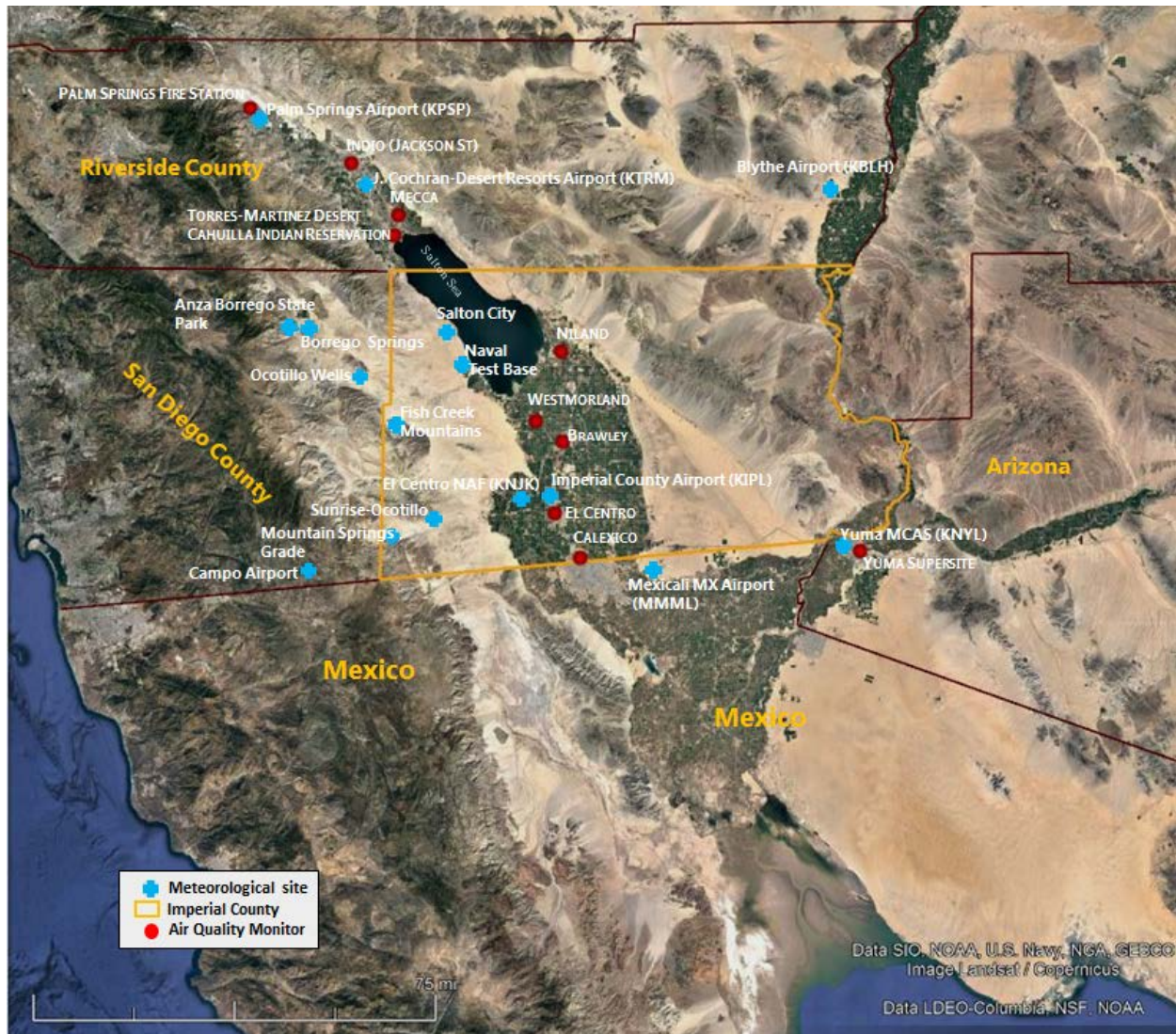
<sup>5</sup> National Weather Service, Area Forecast Discussion, Jan. 19, 2018, San Diego office, 300am PST

<sup>6</sup> National Weather Service, Urgent Weather Message, Jan. 19, 2018 to Jan. 20, 2018, Phoenix office, 1250pm MST and San Diego office, 355am PST

<sup>7</sup> National Weather Service, Area Forecast Discussion, Jan. 18, 2018, Phoenix office, 140pm MST

County elevating concentrations at all air quality monitors in Imperial County, with Brawley and Calexico exceeding the PM<sub>10</sub> NAAQS (**Table 2-1**).

**FIGURE 2-1**  
**MONITORING AND METEOROLOGICAL SITES**



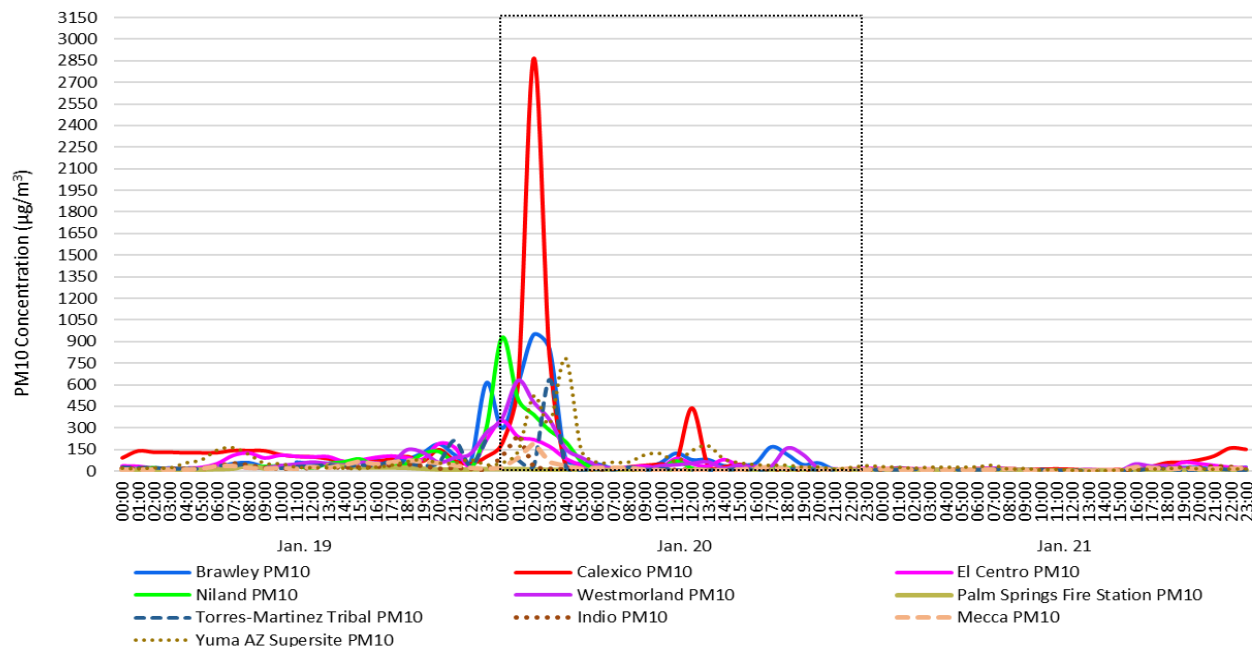
**Fig 2-1:** Includes a general location of the sites used in this analysis. The site furthest south is in Mexico (MMML), and the site furthest north is the Palm Springs Fire Station

**TABLE 2-1**  
**HOURLY CONCENTRATIONS OF PARTICULATE MATTER**

SITE	DATE	000	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Hrly Max	24-Hr Average
PALM SPRINGS FIRE STATION	20180119	10	8	9	8	11	9	13	17	39	18				45	35	25	26	26	23	17	11	9	10	14	45	18
	20180120	12	14	10	8	7	5	7	5	7	3	6	2	3	3	4	7	9	7	8	9	7	6	6	5	14	6
	20180121	6	7	6	8	7	8	8	10	9	7	2	1	2	2	2	2	5	6	6	6	6	6	6	6	10	5
INDIO	20180119	18	15	15	14	14	15	33	53	44	23	18	19	21	28	23	30	28	43	46	37	19	25	14	4	53	24
	20180120	102	254	24	19	16	15	13	19	14	4	1	10	8	6	5	6	26	9	11	12	10	10	12	10	254	25
	20180121	9	14	8	8	10	10	12	11	15	9	5	0	1	3	3	4	9	23	24	22	24	38	28	18	38	12
MECCA	20180119	11	9	8	8	8	14	35	33	20	18	26	16	29	25	41	67	50	59	75	71	56	42	25	19	75	31
	20180120	25	92	198	63	39	14	20	21	22	9	7	0	13	4	6	9	21	28	16	22	18	11	19	12	198	28
	20180121	17	11	8	9	11	13	11	11	19	10	3	0	0	2	4	4	27	23	19	18	18	17	16	21	27	12
TORRES- MARTINEZ TRIBAL	20180119	25	22	23	14	16	15	37	36	53		18	30	33	43	28	41	36	68	54	37	58	213	37	221	221	50
	20180120		76	36	638	34	8	11	7	26	7	15	7	3	4	4	14	8	9	16	12	9	8	9	9	638	42
	20180121	7	7	11	12	7	8	7	12	10	11	9	5	2	2	2	3	1	17	16	3	9	13	8	5	17	7
BRAWLEY	20180119	34	23	22	23	20	23	31	52	59	28		65	58	58	69	66	80	70	84	129	187	114	65	601	601	85
	20180120	301	611	953	849	89	59	54	22	20	29	61	128	82	84	41	48	57	172	120	49	60	14	12	18	953	163
	20180121	8	24	14	13	7	9	8	11	16	12	10	8	6	6	3	0	18	21	36	27	27	14	15	28	36	14
WESTMORLAND	20180119	26	20	16	17	19	23	28	37	23	25	41	51	65	54	45	63	60	57	151	131	63	95	122	269	269	62
	20180120	369	633	481	358	160	97	44	21	30	20	40	46	56	66	22	44	27	36	162	118	20	11	14	13	633	120
	20180121	13	12	10	13	10	8	17	23	18	12	9	7	5	14	7	3	51	37	40	24	12	18	8	8	51	15
NILAND	20180119	20	21	23	16	21	18	20	24	34	34	39	35	23	54	66	86	37	38	55	120	135	55	17	292	292	53
	20180120	905	487	381	274	199	67	14	12	27	17	19	70	21	11	8	5	8	22	24	18	20	14	9	10	905	110
	20180121	7	15	8	10	10	8	11	13	9	9	5	3	2	-2	-3	-2	-1	0	21	18	12	12	8	5	21	7
EL CENTRO	20180119	34	31	20	16	20	25	49	104	121	89	109	101	98	100	67	76	95	104	91	82	186	161	27	213	213	84
	20180120	340	231	211	164	85	40	18	18	25	35	23	85	50	32	78	36	30	19	15	16	16	15	11	19	340	67
	20180121	16	15	14	15	11	12	12	11	18	10	8	7	5	2	5	4	3	20	14	56	49	36	25	21	56	16
CALEXICO	20180119	90	138	129	129	125	125	126	141	140	139	112	100	97	84	64	67	65	83	99	67	147	70	48	98	147	103
	20180120	190	603	2864	802	42	35	20	18	27	38	47	66	436	36	28	45	18	26	13	18	13	10	14	11	2864	225
	20180121	10	17	13	11	12	9	15	18	15	10	11	13	10	6	7	8	6	28	56	60	75	103	158	149	158	34
YUMA AZ SUPERSITE (PST)	20180119	20	16	23	22	57	78	147	163	116	53	52	27	24	24	20	17	28	41	67	81	56	56	80	44	163	54
	20180120	58	136	523	329	785	145	61	62	63	113	122	67	143	177	86	58	45	40	42	28	29	14	25	38	785	132
	20180121	31	28	20	28	27	28	30	41	14	19	8	12	6	1	2	9	8	14	16	25	16	13	14	16	41	17
YUMA AZ SUPERSITE (MST)	20180119	22	20	16	23	22	57	78	147	163	116	53	52	27	24	24	20	17	28	41	67	81	56	56	80	163	53
	20180120	44	58	136	523	329	785	145	61	62	63	113	122	67	143	177	86	58	45	40	42	28	29	14	25	785	133
	20180121	38	31	28	20	28	27	28	30	41	14	19	8	12	6	1	2	9	8	14	16	25	16	13	14	41	18

Color coding information – **Red bold** highlighted sites indicate sites that exceeded the NAAQS. **Blue** dates indicate date of Exceptional Event. **Red fill and Red bold** hourly concentrations represent concentrations above 100 µg/m<sup>3</sup>. **Pink squares** around concentrations identify peak hourly concentrations.

**FIGURE 2-2**  
**CONCENTRATIONS FOR ALL SITES LISTED IN TABLE 2-1**



**Fig 2-2:** is a three-day graphical representation of the PM<sub>10</sub> concentrations measured at the sites identified in **Table 2-1**. Elevated concentrations are notable among sites located further north, except for Calexico

Wind speed, wind direction and the airflow patterns combined all help explain how windblown emissions resulting from the strong gusty westerly winds associated with the passing of the Pacific storm affected the Brawley and Calexico monitors on Saturday, January 20, 2018.

Early weather forecast notices issued by both the San Diego and Phoenix NWS offices indicated that a fast-moving upper-level trough with an associated cold front was poised to move into southeastern California by Friday, January 19, 2018.<sup>8</sup> As the system moved inland moving toward Arizona advisory level winds caused the NWS to issue Urgent Weather Messages, advising the public of strong gusty westerly winds above 25 mph within the San Diego and Imperial counties (**Appendix A**).<sup>9</sup>

**Figures 2-3 and 2-4** depict the compiled wind data for regional and neighboring airports and upstream sites. Airports within Imperial, Riverside and Yuma Counties measured wind speeds at or above 25 mph or measured wind gusts at or above 25 mph.

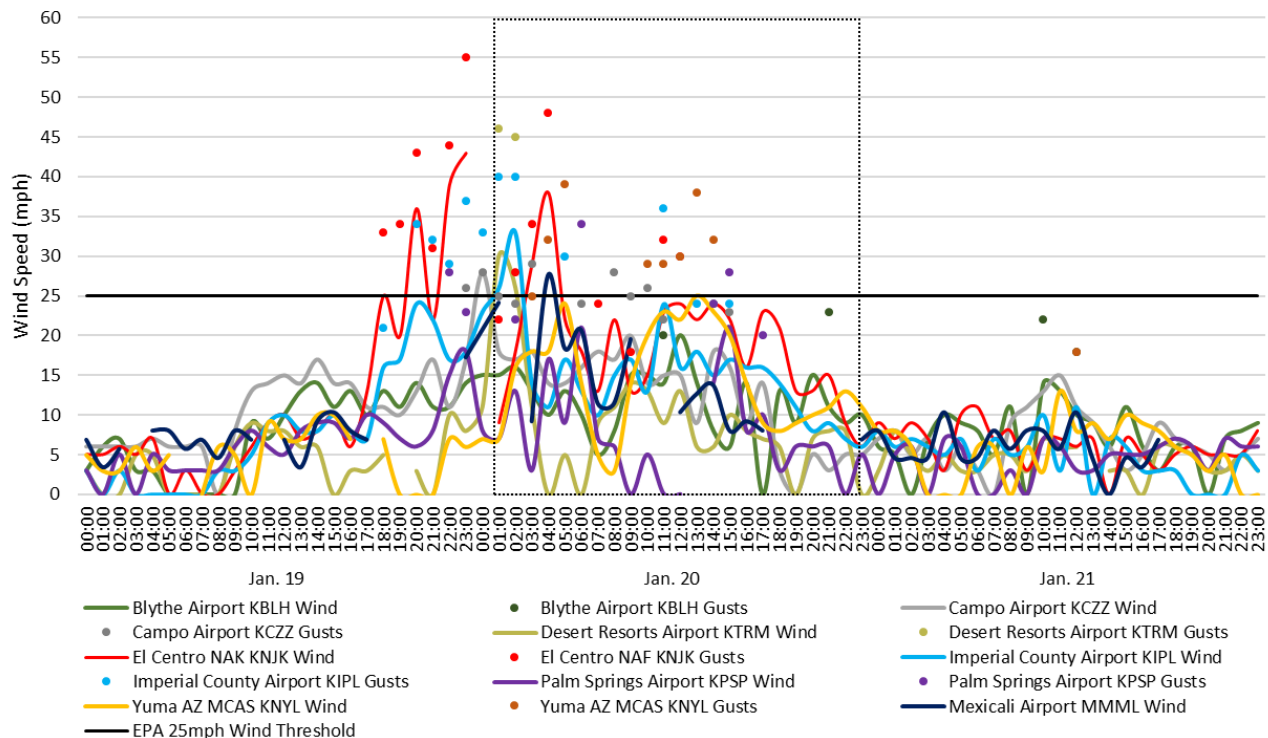
<sup>8</sup> National Weather Service, Area Forecast Discussion, Jan. 17, 2018 & Jan. 18, 2018, San Diego office, 952am PST & Phoenix office, 220am MST, respectively

<sup>9</sup> National Weather Service, Area Forecast Discussion, Jan. 20, 2018, Phoenix office, 255am MST



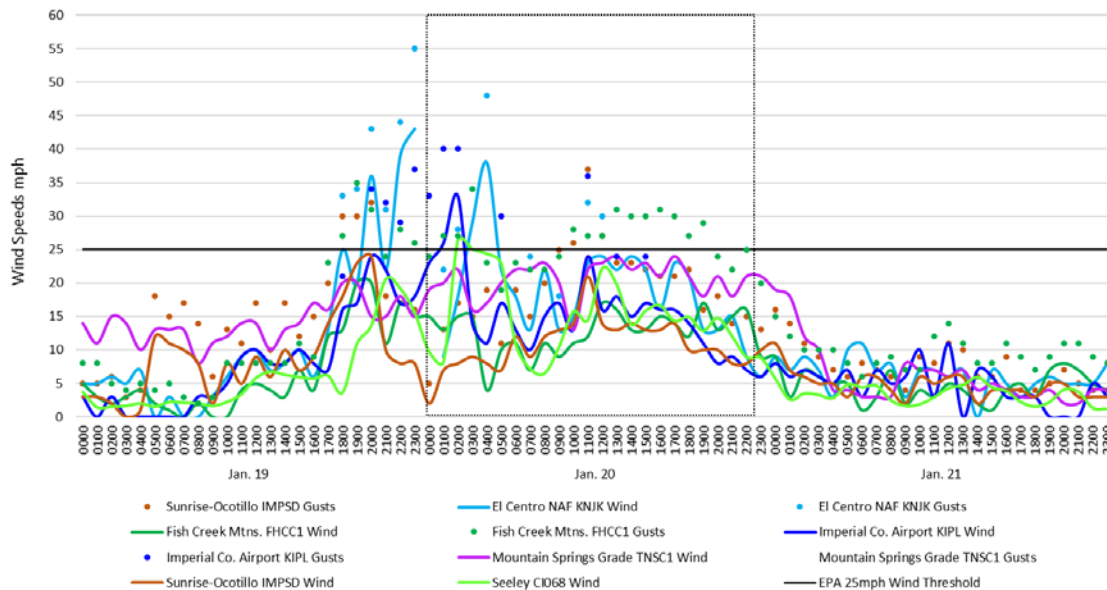
Sites further west and southwest of Imperial County measured elevated wind speeds much sooner than sites further east or within urbanized centers, coincident with measured elevated concentrations.

**FIGURE 2-3**  
**LOCAL AND VICINITY AIRPORT WIND SPEEDS AND GUST**



**Fig 2-3:** is a three-day graphical representation of the measured wind speed and wind gust (if available) from local and neighboring airports. Note the elevated wind speeds are consistent for sites with minor variations. All data derived from the Local Climatological Data Hourly Observations (LCDHO) reports released by the NOAA <https://www.ncdc.noaa.gov/>

**FIGURE 2-4**  
**WIND SPEEDS AND GUST UPSTREAM SITES**



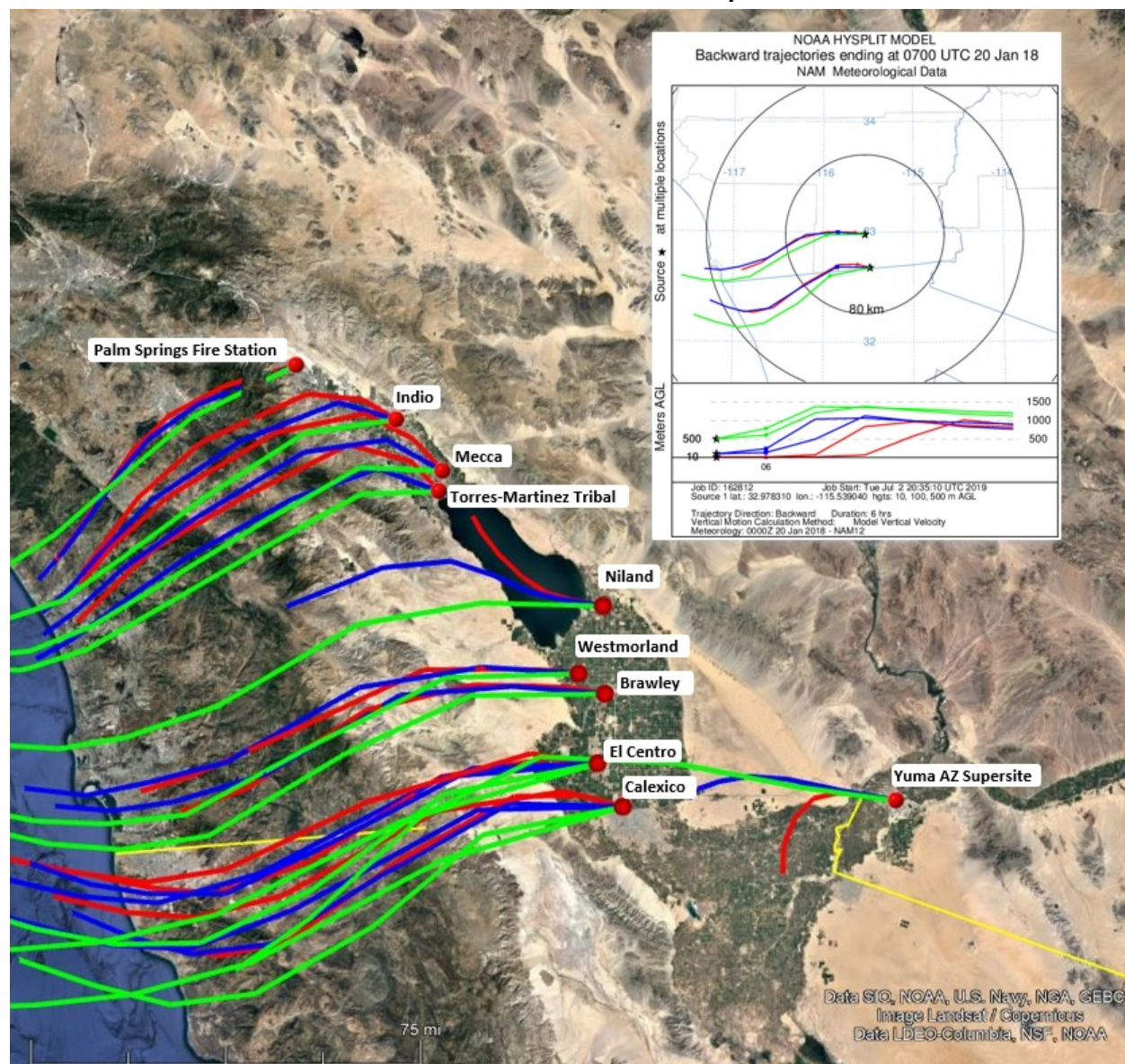
**Fig 2-4:** is a three-day graphical representation of the measured wind speed and wind gust (if available) from sites located upstream from the Brawley and Calexico monitors. All data (except KIPL and KNJK) derived from the University of Utah's Meso West <https://mesowest.utah.edu/index.html>

The National Oceanic and Atmospheric Administration (NOAA) Laboratory HYSPLIT back-trajectory HYSPLIT models<sup>10</sup> provide supporting evidence of the westerly airflow within Imperial County on January 20, 2018. As a two-day event, the HYSPLIT back-trajectory models in **Figures 2-5 through 2-7** depict the airflow during the evening hours of January 19, 2018 (2300 PST), the dawn hours of January 20, 2018 (0200 PST) and late afternoon (1800 PST) to help illustrate the shift of airflow from a due west direction, to a northwest direction, coincident with the passing of the system into Arizona.

**Figure 2-5** depicts the airflow from the west coincident with elevated concentrations above  $100 \mu\text{g}/\text{m}^3$  at all air quality monitors, except Calexico. **Figure 2-6** depicts the continued westerly airflow coincident with peak hourly measured concentrations at the Brawley and Calexico monitors. **Figure 2-7** depicts the shift back to a northwest airflow coincident with measured concentrations starting to reduce. As the system moved further east, concentrations reduced significantly.

<sup>10</sup> The Hybrid Single Particle Lagrangian Integrated Trajectory Model (**HYSPLIT**) is a computer model that is a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. It is currently used to compute air parcel trajectories and dispersion or deposition of atmospheric pollutants. One popular use of HYSPLIT is to establish whether high levels of air pollution at one location are caused by transport of air contaminants from another location. HYSPLIT's back trajectories, combined with satellite images (for example, from NASA's [MODIS](#) satellites), can provide insight into whether high air pollution levels are caused by local air pollution sources or whether an air pollution problem was blown in on the wind. The initial development was a result of a joint effort between NOAA and Australia's Bureau of Meteorology. Source: NOAA/Air Resources Laboratory, 2011.

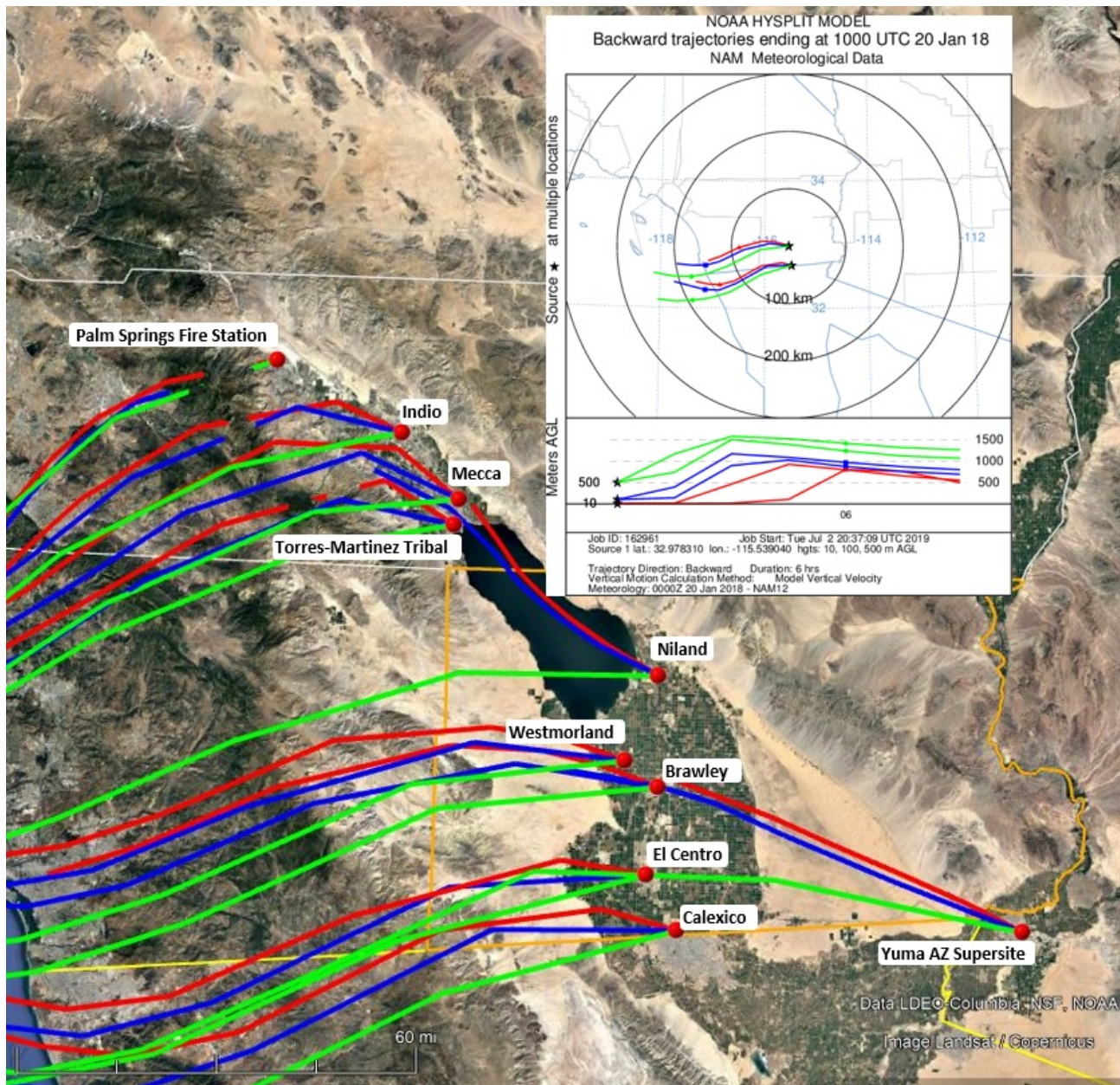
**FIGURE 2-5**  
**HYSPLIT MODEL ALL SITES JANUARY 19, 2018 2300 PST**



**Fig 2-5:** A 6-hour HYSPLIT back-trajectory ending at 2300 PST, January 19, 2018 for all sites identified in **Table 2-1**. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth



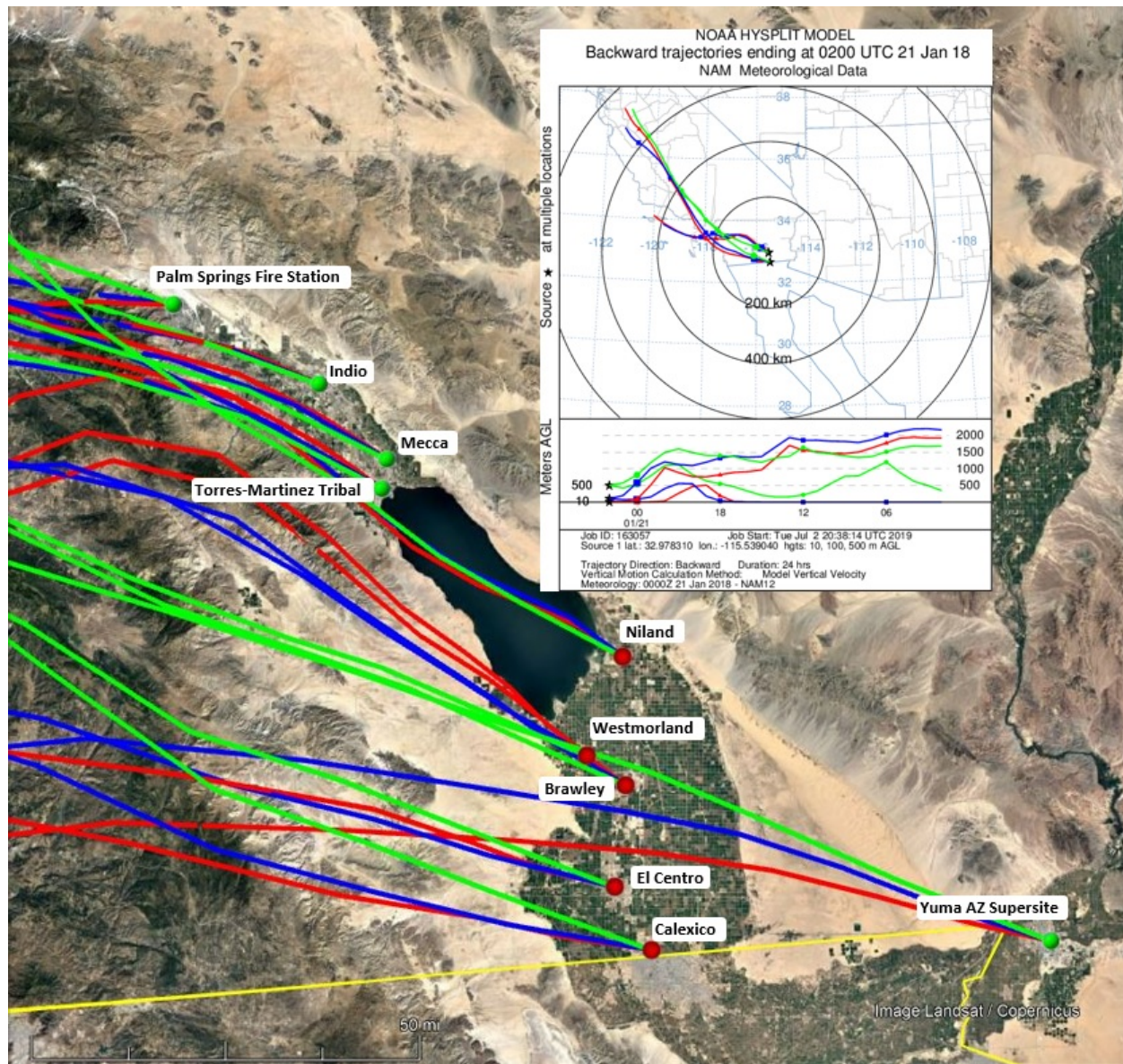
**FIGURE 2-6**  
**HYSPLIT MODEL ALL SITES JANUARY 20, 2018 0200 PST**



**Fig 2-6:** A 6-hour HYSPLIT back-trajectory ending at 0200 PST, January 20, 2018 for all Imperial County sites. Note that by now, air flow is westerly at all heights for all sites except Niland. Brawley and Calexico trajectories are in the HYSPLIT inset. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth



**FIGURE 2-7**  
**HYSPLIT MODEL ALL SITES JANUARY 20, 2018 1800 PST**



**Fig 2-7:** A 24-hour HYSPLIT back-trajectory ending at 1800 PST, January 20, 2018 for all sites depicted in **Table 2-1**. Note that by now, air flow is WNW-NW for all sites, coincident with the passing of the cold front. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

As strong gusty westerly winds blew over open natural mountains and desert areas west of Imperial County, fugitive windblown dust affected all air quality monitors within Imperial County. As the NWS offices realized that the winds would increase to advisory levels, Urgent Weather messages were issued advising of wind speeds in excess of 25 mph and gusts above 25 mph within the San Diego Mountains and Imperial County. The

Imperial County Airport (KIPL) and the El Centro Naval Air Facility (KNJK) both measured elevated winds the evening of January 19, 2018 through the morning of January 20, 2018. KIPL measured peak winds of 38 mph while KNJK measured peak winds of 43 mph, January 20, 2018 and January 19, 2018, respectively. Gusts at both sites were equally elevated. Additionally, meteorological locations WSW and W of Calexico and Brawley measured elevated winds at or above 25 mph.

### **III Clear Causal Relationship – A demonstration that the event affected air quality illustrating the relationship between the event and the monitored exceedance**

As mentioned above, an upper-level trough with associated cold front (Pacific storm), moved inland through California during the evening hours of Friday, January 19, 2018 and into Arizona by Saturday, January 20, 2018 causing stronger onshore flow with cooling, light rain and strong gusty westerly winds along and within the San Diego Mountains and outlying deserts, including Imperial County.<sup>11</sup>

As the Pacific storm moved through California, dropping brief heavy snow showers in the mountains, before saturation could set in, the strong gusty westerly winds generated fugitive dust emissions from the natural mountainous areas, located to the west of Imperial County and transport those emissions into Imperial County causing an exceedance at the Brawley and Calexico monitors.<sup>12</sup>

While elevated wind speeds play a significant and important role in the transportation of dust, gust and precipitation plays an equally significant role in deposition of particulates onto a monitor and the overall affect onto ambient air.<sup>13</sup> As winds and gusts increased during the evening hours of January 19, 2018 and continued into the early hours of January 20, 2018 and transported windblown dust from outlying open natural mountains and deserts into Imperial County air quality degraded. As mentioned in Section I.1 above, the ICAPCD issued an advisory of the potential for elevated particulate matter and the potential of degradation of air quality to a Moderate or Unhealthy for Sensitive Groups level. In addition, the NWS service issued Urgent Weather Messages advising of the potential for increased winds and blowing dust.<sup>14</sup>

**Figure 3-1** below provides an illustration of some of the meteorological conditions, as described above and demonstrated in the HYSPLITS for January 20, 2018, which affected air quality in Imperial County causing an exceedance at the Brawley and Calexico monitors. Although the Pacific storm brought snow showers the preceding gusty westerly winds generated windblown dust emissions within the natural open mountains within San Diego, and blew into and over natural open deserts within Imperil County affecting air quality.

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<sup>11</sup> National Weather Service, Area Forecast Discussion, Jan. 17, 2018, San Diego office, 952am PST

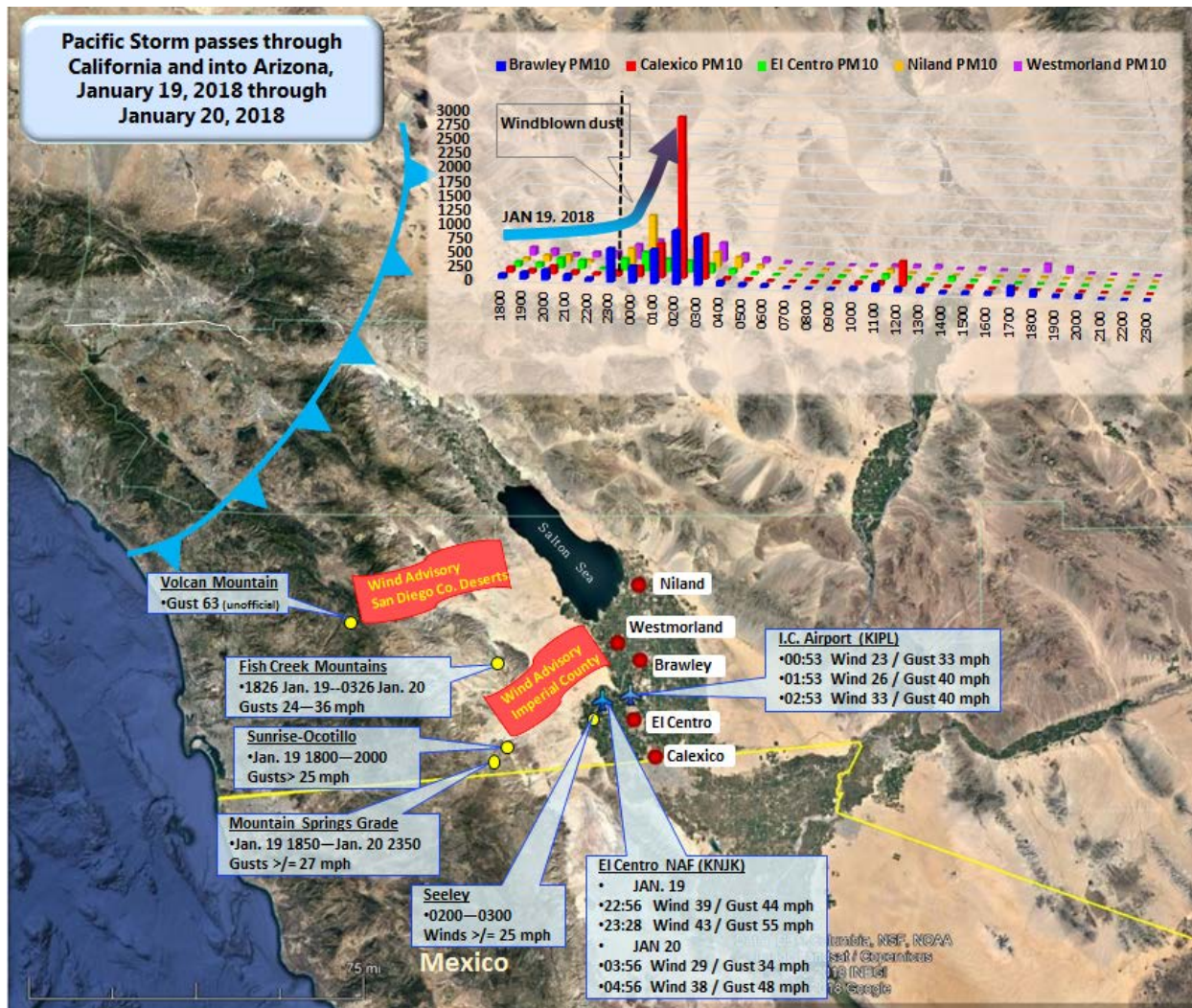
<sup>12</sup> National Weather Service, Area Forecast Discussion, Jan. 19, 2018 & Jan. 20, 2018, San Diego office, 925pm PST & 241pm PST

<sup>13</sup> Gust is a rapid fluctuation of wind speed with variations of 10 knots or more between peaks and lulls; National Weather Service Glossary <https://w1.weather.gov/glossary/index.php?letter=g>

<sup>14</sup> National Weather Service, Urgent Weather Message, Jan. 20, 2018, Phoenix office, 355am MST



**FIGURE 3-1**  
**VISUAL RAMP-UP ANALYSIS AS DISCUSSED FOR JANUARY 20, 2018**



**Fig 3-1:** Gusty pre-frontal westerly winds at upwind sites generated and transported dust from the mountainous ranges west of Imperial County. Air quality data is from the EPA's AQS data bank. Google Earth base map

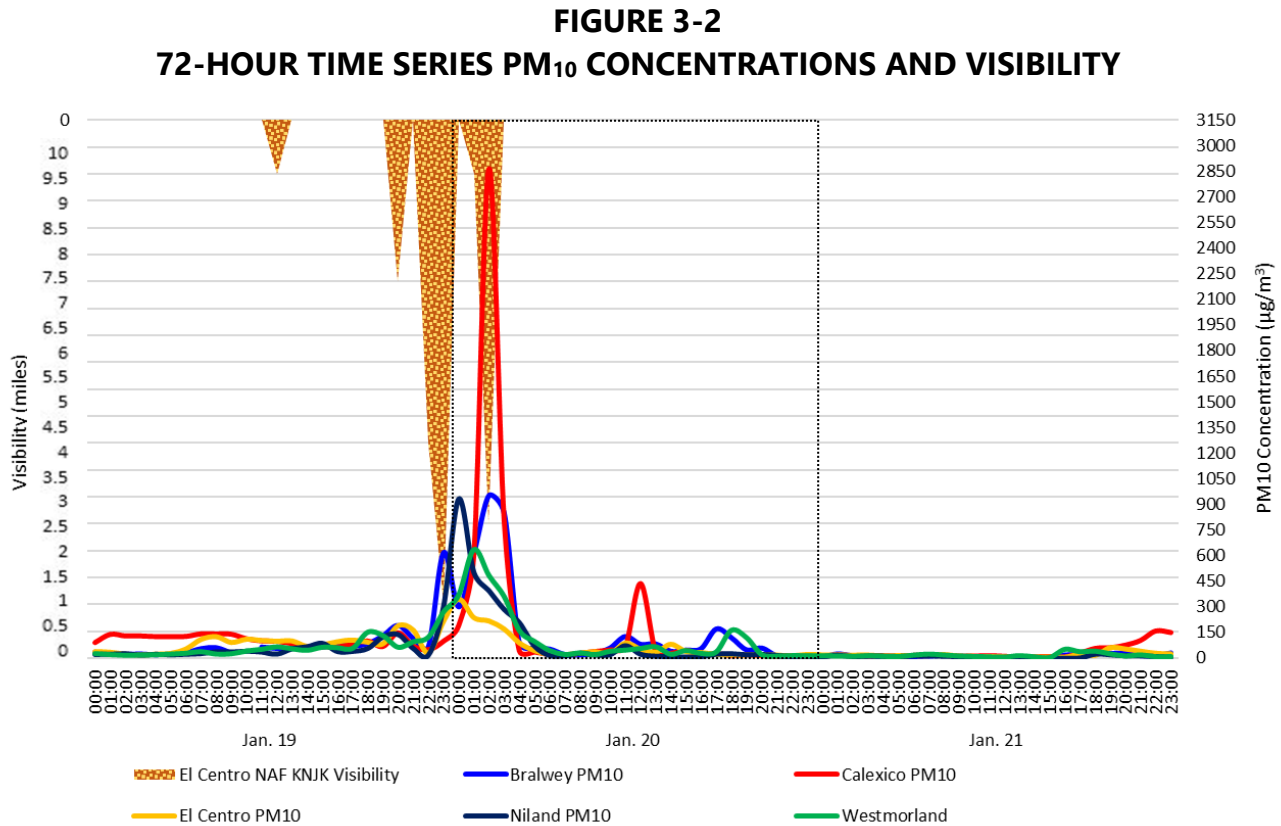
An indicator of the affect to air quality can be discerned from the level of visibility at any given time and day. While the ICAPCD air monitoring stations do not measure levels of visibility the local and surrounding airports do.<sup>15</sup> The El Centro Naval Air Facility (KNJK) reported reduced visibility coincident with elevated wind speeds, wind gusts and hourly concentrations of particulates at both the Brawley and Calexico monitors. **Figure 3-2** and **Tables 3-1 and 3-2** provide information regarding the reduced visibility in Imperial County and the relation to hourly concentrations at local air monitors.

While **Figure 3-2** is a graphical representation of the reduced visibility within Imperial County and surrounding areas, **Tables 3-1 and 3-2** provide a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM<sub>10</sub> concentrations at the Brawley and Calexico monitors. Together, the data provides the supporting relationship between the elevated winds, blowing dust and reduced visibility.

According to the compiled information found in **Figure 3-2**, visibility at KNJK on January 19, 2018 and January 20, 2018 coincident with elevated hourly concentrations at both the Brawley and Calexico monitors in Imperial County.

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<sup>15</sup> According to the NWS there is a difference between human visibility and the visibility measured by an Automated Surface Observing System (ASOS) or an Automated Weather Observing System (AWOS). The automated sensors measure clarity of the air vs. how far one can "see". The more moisture, dust, snow, rain, or particles in the light beam the more light scattered. The sensor measures the return every 30 seconds. The visibility value transmitted is the average 1-minute value from the past 10 minutes. The sensor samples only a small segment of the atmosphere, 0.75 feet. Therefore, a representative visibility utilizes an algorithm. Siting of the visibility sensor is critical and large areas should provide multiple sensors to provide a representative observation; <http://www.nws.noaa.gov/asos/vsby.htm>



**Fig 3-2:** is a graphical representation of the compiled data from the El Centro NAF (KNJK) Airfield. Reported reduced visibility is coincident with elevated winds and hourly levels of concentrations either just prior to peak concentrations or after. Visibility data from the NCEI's QCLCD data bank

Because the EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states<sup>16</sup> the **Tables 3-1 and 3-2** are provided in support of the relationship between the elevated winds and elevated concentrations. In each table the measured elevated concentrations of PM<sub>10</sub> either follow or occur during periods of elevated winds or gusts. Each table has a select group of meteorological sites that compare the hourly winds with the closest measured hourly concentrations at the Brawley and Calexico monitors with a final table comparing select meteorological sites with all monitors.

<sup>16</sup> "Treatment of Data Influenced by Exceptional Events; Final Guidance", FR Vol. 81, No. 191, 68279, October 3, 2016

**TABLE 3-1**  
**WIND SPEEDS AND PM<sub>10</sub> CONCENTRATIONS \*JANUARY 20, 2018**

	MOUNTAIN SPRINGS GRADE (TNSC1)			SUNRISE-OCOTILLO (IMPSD)			SEELEY (CI068)		EL CENTRO NAF (KNJK)			IMPERIAL COUNTY AIRPORT (KIPL)			BRAWLEY	CALEXICO
HOUR	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/D	W/S	W/G	W/D	W/S	W/G	W/D	PM <sub>10</sub> ug/m <sup>3</sup>	
18:00	20	29	224	18	30	250	4	152	25	33	260	16	21	280	84	99
19:00	20	32	213	23	30	242	11	306	20	34	290	17		270	129	67
20:00	15	30	223	24	32	243	14	291	36	43	260	24	34	260	187	147
21:00	15	27	232	10	18	251	21	293	22	31	270	22	32	270	114	70
22:00	18	29	243	8	17	244	19	292	39	44	250	17	29	260	65	48
23:00	15	33	245	8	16	253	16	266	43	55	260	18	37	250	601	98
00:00	19	31	248	2	5	261	10	285				23	33	260	301	190
01:00	20	36	247	7	13	310	8	242	9	22	VRB	26	40	250	611	603
02:00	22	35	245	8	17	295	26	268	18	28	270	33	40	230	953	2864
03:00	16	31	254	9	15	298	25	259	29	34	240	14		270	849	802
04:00	17	32	246	8	19	305	24	258	38	48	240	11		340	89	42
05:00	20	34	239	7	11	293	23	264	22		240	17	30	250	59	35
06:00	22	37	239	12	19	298	11	253	18		230	13		240	54	20
07:00	22	37	239	9	15	273	7	264	13	24	250	10		230	22	18
08:00	23	43	239	12	20	274	7	261	22		250	15		240	20	27
09:00	20	35	240	13	25	277	10	287	13	18	270	17		250	29	38
10:00	13	31	259	14	26	276	16	281	15		260	13		290	61	47
11:00	22	39	235	21	37	270	15	286	23	32	240	24	36	250	128	66
12:00	23	39	241	14	27	275	22	280	24	30	280	16		240	82	436
13:00	24	36	247	13	23	289	20	280	22		280	18	24	280	84	36
14:00	22	35	245	14	23	284	14	312	24		280	15		300	41	28
15:00	23	33	238	13	22	273	16	325	22		280	17	24	300	48	45
16:00	21	32	240	13	21	274	17	327	16		270	16		280	57	18
17:00	24	32	233	14	21	269	14	300	23		260	16		260	172	26
18:00	21	34	222	10	22	263	15	279	21		260	14		260	120	13
19:00	18	34	218	10	16	251	13	281	13		280	11		260	49	18
20:00	21	30	207	10	18	255	15	280	13		260	8		260	60	13
21:00	18	31	213	8	14	254	12	288	15		270	9		240	14	10
22:00	21	32	201	8	15	250	9	275	9		250	7		260	12	14
23:00	21	31	202	10	13	241	9	277	6		260	6		260	18	11

\*Blue hours represent previous day, January 19, 2018. Wind data for KIPL and KNJK from the NCEI's QCLCD system. Wind data for Seeley (CI068) from the University of Utah's MesoWest system. Wind speeds = mph; Direction = degrees. Due to the different times that wind data and air quality data is sampled at various sites, the hour given represents the hour in which the measurement was taken. Air quality data from the EPA AQS repository

**TABLE 3-2**  
**WIND SPEEDS AND PM<sub>10</sub> CONCENTRATIONS \*JANUARY 20, 2018**

	MOUNTAIN SPRINGS GRADE (TNSC1)			SUNRISE- OCOTILLO (IMPSD)			SEELEY (CI068)		EL CENTRO NAF (KNJK)			IMPERIAL COUNTY AIRPORT (KIPL)			WSTMRLD	BRWLY	NLND	EC	CLX
HOUR	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/D	W/S	W/G	W/D	W/S	W/G	W/D	PM <sub>10</sub> ug/m <sup>3</sup>				
18:00	20	29	224	18	30	250	4	152	25	33	260	16	21	280	148	84	55	91	99
19:00	20	32	213	23	30	242	11	306	20	34	290	17		270	128	129	120	82	67
20:00	15	30	223	24	32	243	14	291	36	43	260	24	34	260	61	187	135	186	147
21:00	15	27	232	10	18	251	21	293	22	31	270	22	32	270	93	114	55	161	70
22:00	18	29	243	8	17	244	19	292	39	44	250	17	29	260	119	65	17	27	48
23:00	15	33	245	8	16	253	16	266	43	55	260	18	37	250	262	601	292	213	98
00:00	19	31	248	2	5	261	10	285				23	33	260	358	301	905	340	190
01:00	20	36	247	7	13	310	8	242	9	22	VRB	26	40	250	611	611	487	231	603
02:00	22	35	245	8	17	295	26	268	18	28	270	33	40	230	463	953	381	211	2864
03:00	16	31	254	9	15	298	25	259	29	34	240	14		270	343	849	274	164	802
04:00	17	32	246	8	19	305	24	258	38	48	240	11		340	153	89	199	85	42
05:00	20	34	239	7	11	293	23	264	22		240	17	30	250	93	59	67	40	35
06:00	22	37	239	12	19	298	11	253	18		230	13		240	42	54	14	18	20
07:00	22	37	239	9	15	273	7	264	13	24	250	10		230	20	22	12	18	18
08:00	23	43	239	12	20	274	7	261	22		250	15		240	29	20	27	25	27
09:00	20	35	240	13	25	277	10	287	13	18	270	17		250	19	29	17	35	38
10:00	13	31	259	14	26	276	16	281	15		260	13		290	39	61	19	23	47
11:00	22	39	235	21	37	270	15	286	23	32	240	24	36	250	45	128	70	85	66
12:00	23	39	241	14	27	275	22	280	24	30	280	16		240	54	82	21	50	436
13:00	24	36	247	13	23	289	20	280	22		280	18	24	280	64	84	11	32	36
14:00	22	35	245	14	23	284	14	312	24		280	15		300	21	41	8	78	28
15:00	23	33	238	13	22	273	16	325	22		280	17	24	300	43	48	5	36	45
16:00	21	32	240	13	21	274	17	327	16		270	16		280	26	57	8	30	18
17:00	24	32	233	14	21	269	14	300	23		260	16		260	34	172	22	19	26
18:00	21	34	222	10	22	263	15	279	21		260	14		260	154	120	24	15	13
19:00	18	34	218	10	16	251	13	281	13		280	11		260	112	49	18	16	18
20:00	21	30	207	10	18	255	15	280	13		260	8		260	19	60	20	16	13
21:00	18	31	213	8	14	254	12	288	15		270	9		240	10	14	14	15	10
22:00	21	32	201	8	15	250	9	275	9		250	7		260	13	12	9	11	14
23:00	21	31	202	10	13	241	9	277	6		260	6		260	12	18	10	19	11

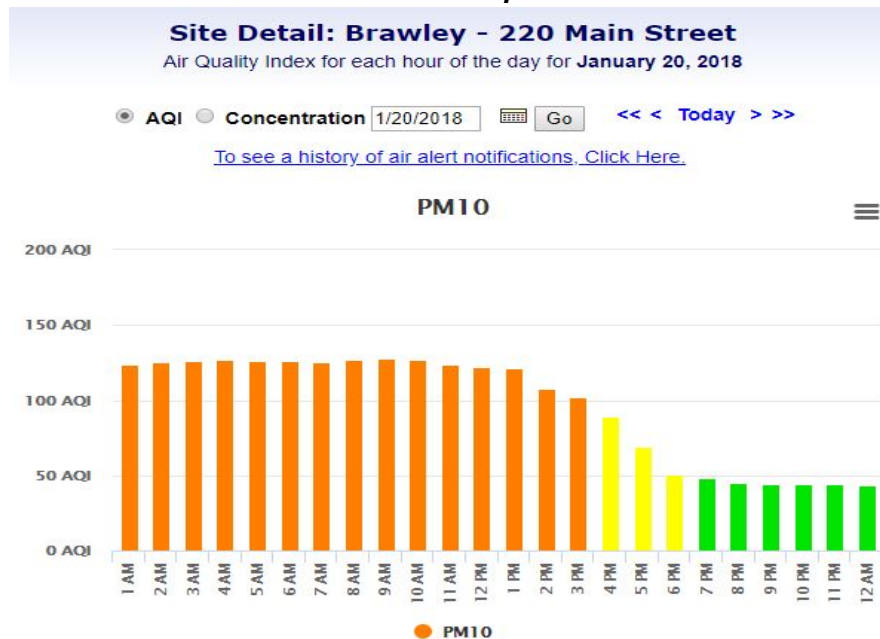
\*Blue hours represent previous day, January 19, 2018. Wind data for KIPL and KNJK from the NCEI's QCLCD system. Wind data for Seeley (CI068) from the University of Utah's MesoWest system. Wind speeds = mph; Direction = degrees. Due to the different times that wind data and air quality data is sampled at various sites, the hour given represents the hour in which the measurement was taken. Air quality data from the EPA AQS repository



As mentioned above, Urgent Weather Messages and Area Forecast Discussions containing wind advisories described the gusty westerly winds for the region extending into the San Diego Mountains and deserts in Imperial County. As the Pacific storm made landfall, the preceding gusty westerly winds affected different regional air monitors in Imperial County and Arizona (**Table 2-1**).

The ICAPCD monitors air quality for each of its stations and issues web-based Air Quality Indices in response to changes in air quality.<sup>17</sup> As transported windblown dust entered Imperial County during the evening hours of January 19, 2018 and into the early hours of January 20, 2018 air quality degraded to moderate levels. Overall, the preceding winds associated with the Pacific storm affected air quality in Imperial County.

**FIGURE 3-3**  
**IMPERIAL VALLEY AIR QUALITY INDEX FOR BRAWLEY**  
**JANUARY 20, 2018**



**Fig 3-3:** The degradation, or affect upon air quality, may be determined when the AQI changes from an "Orange" or Unhealthy for Sensitive Groups level to a "Green" or Good condition

<sup>17</sup> The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health affects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country. Source: <https://airnow.gov/index.cfm?action=aqibasics.aqi>

**FIGURE 3-4**  
**IMPERIAL VALLEY AIR QUALITY INDEX FOR CALEXICO**  
**JANUARY 20, 2018**



**Fig 3-4:** The degradation, or affect upon air quality, may be determined when the AQI changes from an “Orange” or Unhealthy for Sensitive Groups level to a “Green” or Good condition.

### III.1 Summary of Forecasts and Warnings

Days before and during Saturday, January 20, 2018 the National Weather Service (NWS) offices in Phoenix and San Diego issued Area Forecast Discussions describing an upper-level trough with an associated cold front (Pacific Storm) moving across the region.<sup>18</sup> The Pacific Storm was forecasted to move inland through California during the evening hours of Friday, January 19, 2018 and into Arizona by Saturday, January 20, 2018 bringing stronger onshore flow, cooling, light rain and strong gusty westerly winds into the mountains and deserts.<sup>19</sup>

The preceding gusty westerly winds, increased significantly as the weather system moved across California prompting the NWS office to issue Urgent Weather Messages advising the public of advisory level winds in excess of 25 mph and potential gusts at or above 45 mph along mountain ridgetops and deserts.<sup>20</sup> Wind advisories and Winter Weather advisories continued through Saturday, January 20, 2018. Finally, the ICAPCD issued advisories advising the public of the potential for elevated particulate matter as a result

<sup>18</sup> National Weather Service, Area Forecast Discussion, Jan. 17, 2018, San Diego office, 952am PST

<sup>19</sup> National Weather Service, Area Forecast Discussion, Jan. 19, 2018, San Diego office, 300am PST

<sup>20</sup> National Weather Service, Urgent Weather Message, Jan. 19, 2018 – Jan. 20, 2018, Phoenix office, 1250pm MST and San Diego office, 355am PST

of the passing Pacific storm.

### **III.2 Summary of Wind Observations**

As demonstrated above wind data during the event were available from airports in eastern Riverside County, southeastern San Diego County, southwestern Yuma County (Arizona), and Imperial County as well as from other automated meteorological instruments upstream from the Brawley and Calexico monitors. Data analysis indicates that during the evening hours of January 19, 2018 and during the dawn hours of January 20, 2018 different sites measured wind speeds at or above 25 mph.

#### **IV Concentration to Concentration Analysis – An analyses comparing the event-influenced concentrations to concentrations at the same monitoring site at other times**

While naturally occurring high wind events may recur seasonally and at times frequently and qualify for exclusion under the EER, historical comparisons of the particulate concentrations and associated winds provide insight into the frequency of events within an identified area.

**Figures 4-1 through 4-4** show the time series of available FRM and BAM 24-hr PM<sub>10</sub> concentrations at the Brawley and Calexico monitor for the period of January 1, 2010 through January 20, 2018. The compiled data set below includes non-regulatory data prior to 2013. As a consequence, continuous monitoring data (hourly concentrations) prior to 2013 were not reported into the US EPA Air Quality System (AQS).<sup>21</sup> The difference between the standard and local condition concentrations is not significant enough to change the outcome of the analysis.

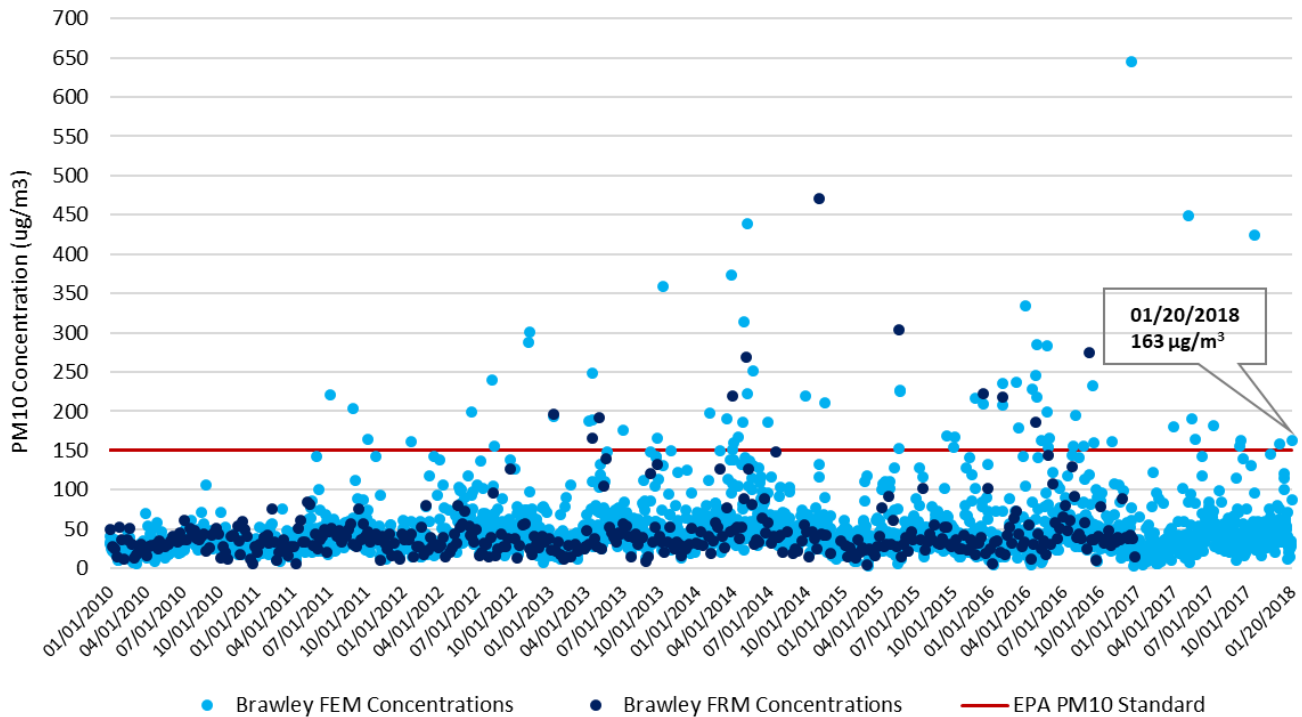
Compiled and plotted 24-hour averaged PM<sub>10</sub> concentrations, between January 1, 2010 and January 20, 2018, as measured by the Brawley, and Calexico monitors were used to establish the historical and seasonal variability over time.<sup>22</sup> All figures illustrate that the exceedance, which occurred on January 20, 2018, was outside the normal historical concentrations when compared to event and non-event days. Air quality data for all graphs obtained through the EPA's AQS data bank.

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<sup>21</sup> Pollutant concentration data contained in EPA's Air Quality System (AQS) are required to be reported in units corrected to standard temperature and pressure (25 C, 760 mm Hg). Because the PM<sub>10</sub> concentrations prior to 2013 were not reported into the AQS database all BAM (FEM) data prior to 2013 within this report are expressed as micrograms per cubic meter (mg/m<sup>3</sup>) at local temperature and pressure (LTP) as opposed to standard temperature and pressure (STP 760torr and 25C). The difference in concentration measurements between standard conditions and local conditions is insignificant and does not alter or cause any significant changes in conclusions to comparisons of PM<sub>10</sub> concentrations to PM<sub>10</sub> concentrations with in this demonstration.

<sup>22</sup> FRM sampling ended December 2016.

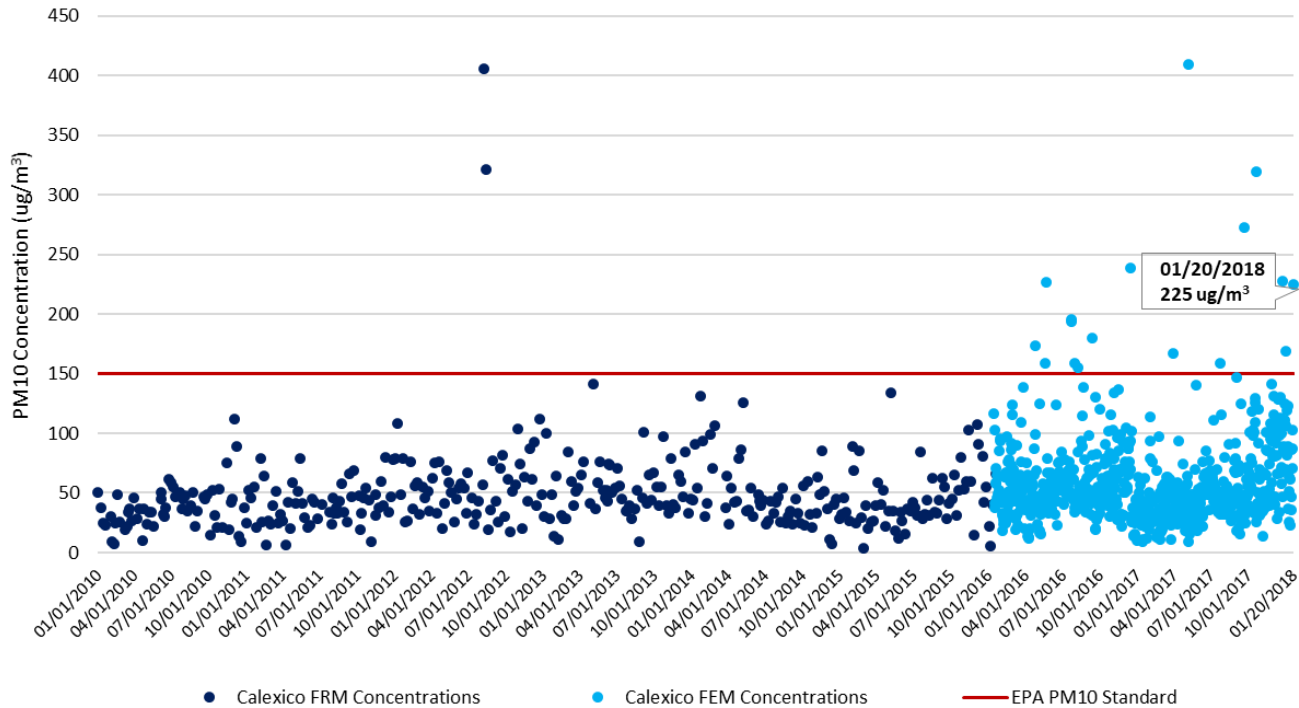
**FIGURE 4-1**  
**BRAWLEY HISTORICAL COMPARISON**  
**FRM AND FEM PM<sub>10</sub> 24-HR AVG CONCENTRATIONS**  
**JANUARY 1, 2010 TO JANUARY 20, 2018**



**Fig 4-1:** A comparison of PM<sub>10</sub> historical concentrations demonstrates that the measured concentration of 163  $\mu\text{g}/\text{m}^3$  on January 20, 2018 by the Brawley monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-1**, for Brawley included 2,942 sampling days (January 1, 2010 through January 20, 2018). Of the 2,942 sampling days the Brawley monitor measured 69 exceedance days which translates into an occurrence rate less than 2.5%. Historically, there were thirteen (13) exceedance days measured during the first quarter, twenty-seven (27) exceedance days measured during the second quarter, sixteen (16) exceedance days measured during the third quarter; and thirteen (13) exceedance days measured during the fourth quarter.

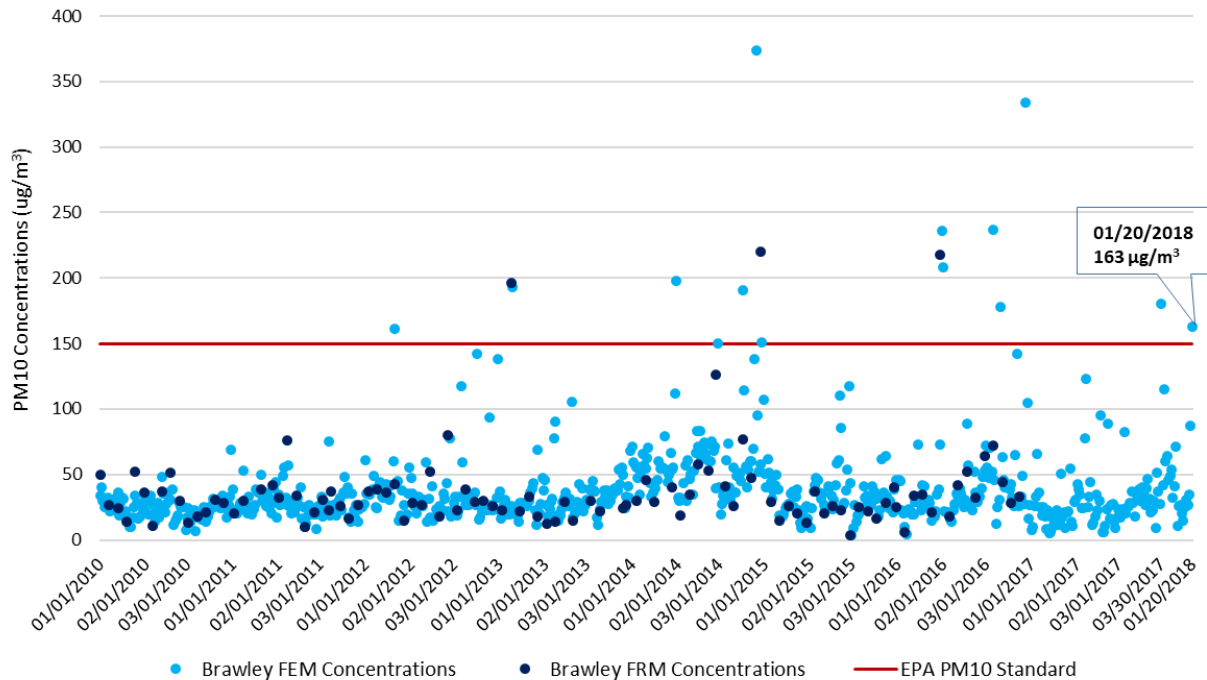
**FIGURE 4-2**  
**CALEXICO HISTORICAL COMPARISON**  
**FRM AND FEM PM<sub>10</sub> 24-HR AVG CONCENTRATIONS**  
**JANUARY 1, 2010 TO JANUARY 20, 2018**



**Fig 4-2:** A comparison of PM<sub>10</sub> historical concentrations demonstrates that the measured concentration of 225  $\mu\text{g}/\text{m}^3$  on January 20, 2018 by the Callexico monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-2**, for Callexico included 1,153 sampling days (January 1, 2010 through January 20, 2018). Of the 1,153 sampling days the Callexico monitor measured 19 exceedance days which translates into an occurrence rate less than 2%. Historically, there were three (3) exceedance days measured during the first quarter, four (4) exceedance days measured during the second quarter, nine (9) exceedance days measured during the third quarter; and three (3) exceedance days measured during the fourth quarter.

**FIGURE 4-3**  
**BRAWLEY SEASONAL COMPARISON**  
**FRM AND FEM PM<sub>10</sub> 24-HR AVG CONCENTRATIONS**  
**\*JANUARY 1, 2010 TO JANUARY 20, 2018**

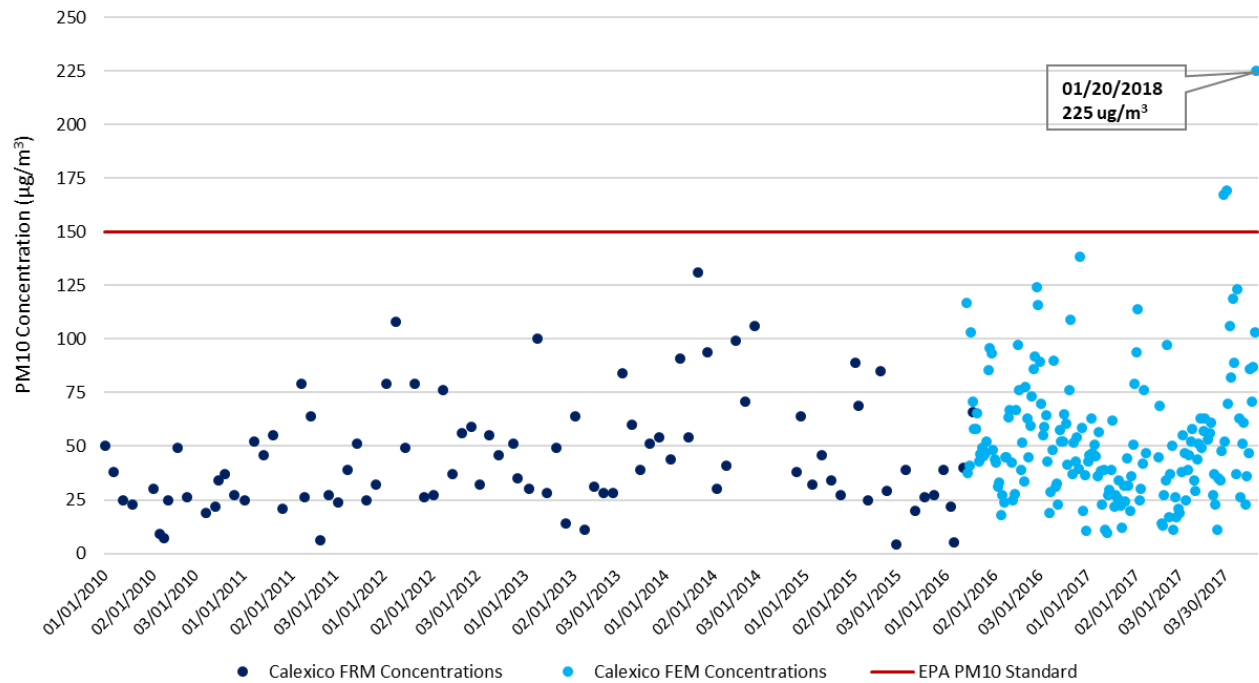


\* Quarterly: January 1, 2010 to March 30, 2017 and January 1, 2018 to January 20, 2018

**Fig 4-3:** A comparison of PM<sub>10</sub> seasonal concentrations demonstrates that the measured concentration of 163 µg/m<sup>3</sup> on January 20, 2018 by the Brawley monitor was outside the seasonal concentrations when compared to similar event days and non-event days

**Figure 4-3** illustrates the seasonal fluctuations over a period of 742 sampling days, 844 credible samples and thirteen (13) exceedance days. This translates to less than a 2% seasonal exceedance occurrence rate.

**FIGURE 4-4**  
**CALEXICO SEASONAL COMPARISON**  
**FRM AND FEM PM<sub>10</sub> 24-HR AVG CONCENTRATIONS**  
**\*JANUARY 1, 2010 TO JANUARY 20, 2018**



**\* Quarterly: January 1, 2010 to March 30, 2017 and January 1, 2018 to January 20, 2018**

**Fig 4-4:** A comparison of PM<sub>10</sub> seasonal concentrations demonstrates that the measured concentration of 225 µg/m<sup>3</sup> on January 20, 2018 by the Callexico monitor was outside the seasonal concentrations when compared to similar event days and non-event days

**Figure 4-4** illustrates the seasonal fluctuations over a period of 289 sampling days, 270 credible samples and three (3) exceedance days. This translates to less than a 1.5% seasonal exceedance occurrence rate.

Examining the historical and seasonal time series concentrations as they relate to the January 20, 2018 measured exceedances, the exceedances measured on January 20, 2018 are clearly outside the normal concentration levels when comparing to similar event days and non-event days.



**V Both Not Reasonably Controllable and Not Reasonably Preventable – A demonstration that the event was both not reasonably controllable and not reasonably preventable**

The analysis above, under the Clear Causal Relationship, indicates that the primary sources affecting air quality in Imperial County originated within the natural open areas of the San Diego Mountains and the natural open deserts to the west of Imperial County. The origination of these emissions from these areas affected all the air quality monitors on January 20, 2018. Since Imperial County does not have jurisdiction over emissions emanating from San Diego County, it is not reasonably controllable or preventable by Imperial County. For a brief description of the controls implemented by sources beyond the control of Imperial County see section V.1 below.

As mentioned above in Section I.4, Mitigation of Exceptional Events contains significant information regarding the application of Best Available Control Measures that are used as measures to abate or minimize contributing controllable sources of identified pollutants (**Page 12, sub-section II.2 of the High Wind Mitigation Plan**). In addition, the mitigation plan explains the methods utilized to minimize public exposure to high concentrations of identified pollutants, the process utilized to collect and maintain data pertinent to any identified event, and the mechanisms utilized to consult with other air quality managers within the affected area regarding the appropriate responses to abate and minimize affects.

Inhalable particulate matter (PM<sub>10</sub>) contributes to effects that are harmful to human health and the environment, including premature mortality, aggravation of respiratory and cardiovascular disease, decreased lung function, visibility impairment, and damage to vegetation and ecosystems. Upon enactment of the 1990 Clean Air Act (CAA) amendments, Imperial County was classified as moderate nonattainment for the PM<sub>10</sub> NAAQS under CAA sections 107(d)(4)(B) and 188(a). By November 15, 1991, such areas were required to develop and submit State Implementation Plan (SIP) revisions providing for, among other things, implementation of reasonably available control measures (RACM).

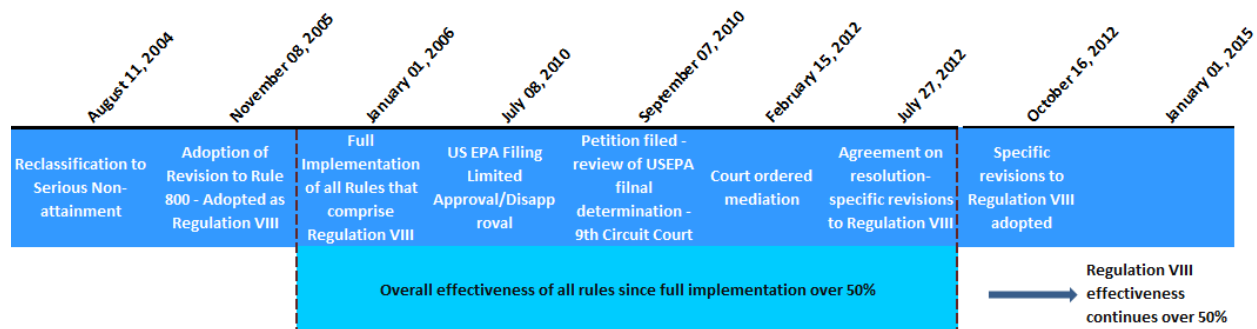
Partly to address the RACM requirement, ICAPCD adopted local Regulation VIII rules to control PM<sub>10</sub> from sources of fugitive dust on October 10, 1994, and revised them on November 25, 1996. USEPA did not act on these versions of the rules with respect to the federally enforceable SIP.

On August 11, 2004, USEPA reclassified Imperial County as a serious nonattainment area for PM<sub>10</sub>. As a result, CAA section 189(b)(1)(B) required all BACM to be implemented in the area within four years of the effective date of the reclassification, i.e., by September 10, 2008.

On November 8, 2005, partly to address the BACM requirement, ICAPCD revised the Regulation VIII rules to strengthen fugitive dust requirements. On July 8, 2010, USEPA finalized a limited approval of the 2005 version of Regulation VIII, finding that the seven Regulation VIII rules largely fulfilled the relevant CAA requirements. Simultaneously, USEPA also finalized a limited disapproval of several of the rules, identifying specific deficiencies that needed to be addressed to fully demonstrate compliance with CAA requirements regarding BACM and enforceability.

In September 2010, ICAPCD and the California Department of Parks and Recreation (DPR) filed petitions with the Ninth Circuit Federal Court of Appeals for review of USEPA's limited disapproval of the rules. After hearing oral argument on February 15, 2012, the Ninth Circuit directed the parties to consider mediation before rendering a decision on the litigation. On July 27, 2012, ICAPCD, DPR and USEPA reached agreement on a resolution to the dispute, which included a set of specific revisions to Regulation VIII. The October 16, 2012 adopted revision reflects the specific revisions to Regulation VIII, which USEPA approved on April 22, 2013. Since 2006, ICAPCD had implemented regulatory measures to control emissions from fugitive dust sources and open burning in Imperial County.

**FIGURE 5-1  
REGULATION VIII GRAPHIC TIMELINE DEVELOPMENT**



**Fig 5-1: Regulation VIII Graphic Timeline**

## V.1 Other PM<sub>10</sub> Control Measures

In addition to the rules and regulations listed above, other PM<sub>10</sub> control measures have been committed to, and implemented by, local California air districts bordering ICAPCD. San Diego County (to the west of Imperial County) and eastern Riverside County (outside

of the Coachella Valley Planning Area and to the north and northeast of Imperial County) are both designated unclassified for the PM<sub>10</sub> NAAQS and are not required to have BACM controls for PM<sub>10</sub>. The Coachella Valley Planning Area in Riverside County, to the north and northwest of Imperial County, is designated a PM<sub>10</sub> nonattainment area, and a redesignation request and maintenance plan were submitted to USEPA in 2010. These three areas and their relevant PM<sub>10</sub> rules are indicated in **Tables 5-1 to 5-3**.

**TABLE 5-1**  
**SAN DIEGO AIR POLLUTION CONTROL DISTRICT (SDAPCD)**

RULES REGULATING EXISTING AND NEW NON-POINT SOURCES IN SAN DIEGO COUNTY	
RULE NUMBER AND TITLE	DESCRIPTION
Rule 52 – Particulate Matter	Limits the amount of particulate matter that may be discharged from any source.
Rule 52.1 – NSPS and NESHAPS Particulate Matter Requirements	Ensures that sources subject to NSPS or NESHAPS also conform to Regulation X and XI, respectively.
Rule 54 – Dust and Fumes	Minimizes the amount of dust that can be discharged in a specified time period.
Rule 55 – Fugitive Dust Control	Provides a mechanism to regulate operations that may cause fugitive dust emissions.
Rule 101 – Burning Control	Establishes conditions, including high winds, under which burning would be curtailed or prohibited.

**TABLE 5-2**  
**MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT (AQMD)**

RULES REGULATING EXISTING AND NEW NON-POINT SOURCES IN EASTERN RIVERSIDE COUNTY OUTSIDE OF THE COACHELLA VALLEY PLANNING AREA	
RULE NUMBER AND TITLE	DESCRIPTION
Rule 403 – Fugitive Dust	Limits the amount of particulate matter that may be discharged from specific sources, not including unpaved public roads or farm roads, or industrial or commercial facilities.
Rule 404 – Particulate Matter Concentration	Limits the concentration of PM <sub>10</sub> allowed in discharged gas.
Rule 405 – Solid Particulate Matter Weight	Limits the amount of PM <sub>10</sub> that can be discharged on an hourly basis.

**TABLE 5-3**  
**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)**

RULES REGULATING EXISTING AND NEW NON-POINT SOURCES IN RIVERSIDE COUNTY AND THE COACHELLA VALLEY, INSIDE OF THE COACHELLA VALLEY PLANNING AREA	
RULE NUMBER AND TITLE	DESCRIPTION
Rule 403– Fugitive Dust	Requires implementation of control measures to prevent, reduce, or mitigate fugitive dust emissions.
Rule 403.1 – Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources	Establishes special requirements for Coachella Valley dust sources under high-wind conditions and requires SCAPCD approval of dust control plans for sources not subject to local government ordinances.
Rule 1156 – Further Reductions of Particulate Emissions from Cement Manufacturing Facilities	Establishes requirements to reduce particulate matter emissions from cement manufacturing operations and properties.
Rule 1157 – PM <sub>10</sub> Emission Reductions from Aggregate and Related Operations	Establishes additional source specific performance standards and specifies operational PM <sub>10</sub> controls specific to aggregate and related operations.
Rule 1186 – PM <sub>10</sub> Emissions from Paved and Unpaved Roads and Livestock Operation	Limits the amount of particulate matter entrained as a result of vehicular travel on paved and unpaved public roads, and at livestock operations.
Rule 1466 – Control of Particulate Emissions from Soils with Toxic Air Contaminants	Establishes a PM <sub>10</sub> ambient dust concentration limit, dust control measures, and notification requirements prior to earth-moving activities or when PM <sub>10</sub> dust concentrations are exceeded.

## V.2 Wind Observations

As previously discussed wind data analysis indicates that on January 20, 2018 different sites measured wind speeds at or above 25 mph. Wind speeds of 25 mph are normally sufficient to overcome most PM<sub>10</sub> control measures. During the January 20, 2018 event, wind speeds were above the 25 mph threshold, overcoming the BACM in place.

## V.3 Review of Source Permitted Inspections and Public Complaints

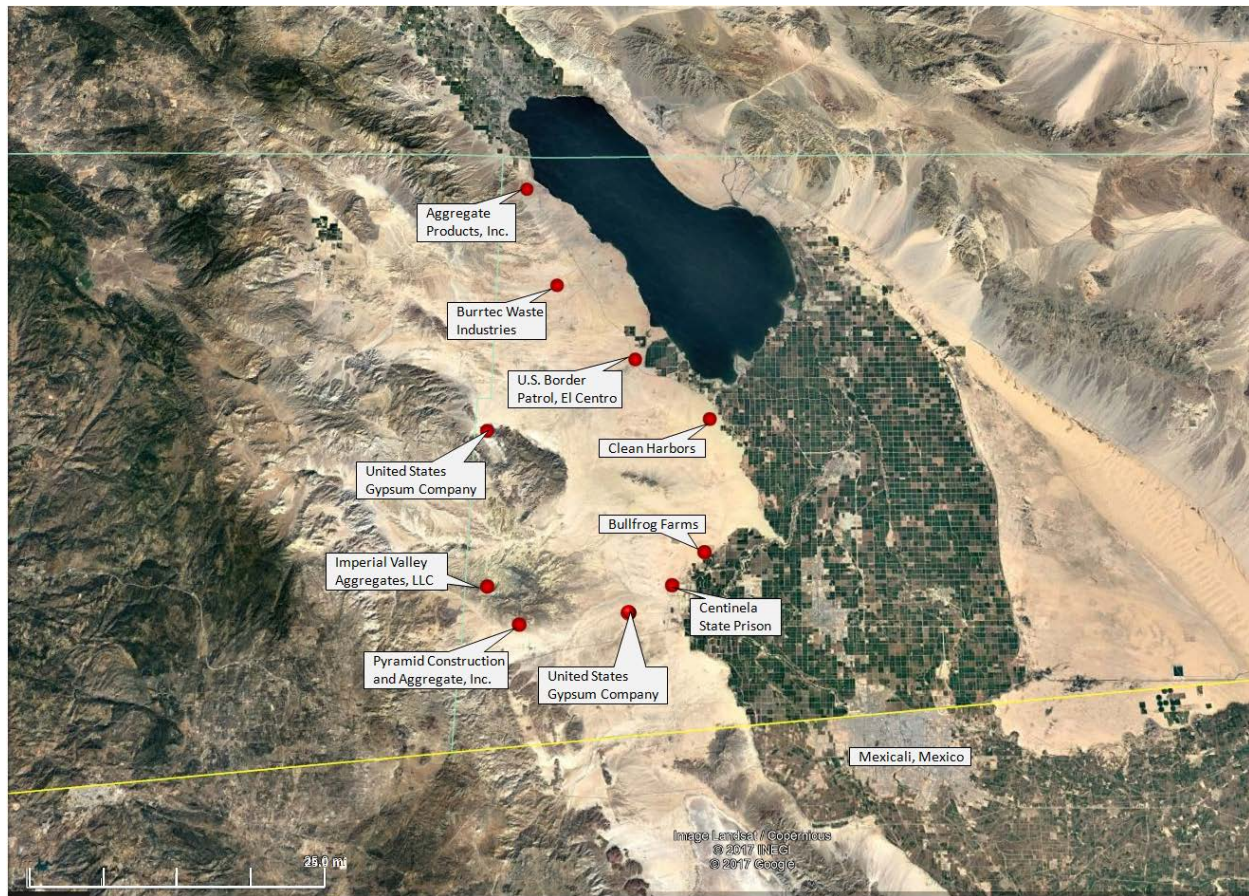
A query of the ICAPCD permit database was compiled and reviewed for active permitted sources throughout Imperial County and specifically around Brawley and Calexico during the January 20, 2018 PM<sub>10</sub> exceedance. Both permitted and non-permitted sources are required to comply with Regulation VIII requirements that address fugitive dust emissions. The identified permitted sources are Aggregate Products, Inc., US Gypsum Quarry,

Imperial Aggregates (Val-Rock, Inc., and Granite Construction), US Gypsum Plaster City, Clean Harbors (Laidlaw Environmental Services), Bullfrog Farms (Dairy), Burrtec Waste Industries, Border Patrol Inspection station, Centinela State Prison, various communications towers not listed and various agricultural operations. Non-permitted sources include the wind farm known as Ocotillo Express, and a solar facility known as CSolar IV West. Finally, the desert regions are under the jurisdiction of the Bureau of Land Management and the California Department of Parks (Including Anza Borrego State Park and Ocotillo Wells).

An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM<sub>10</sub> emissions. There were no complaints filed on January 20, 2018, officially declared as No Burn Day, related to agricultural burning, waste burning or dust.

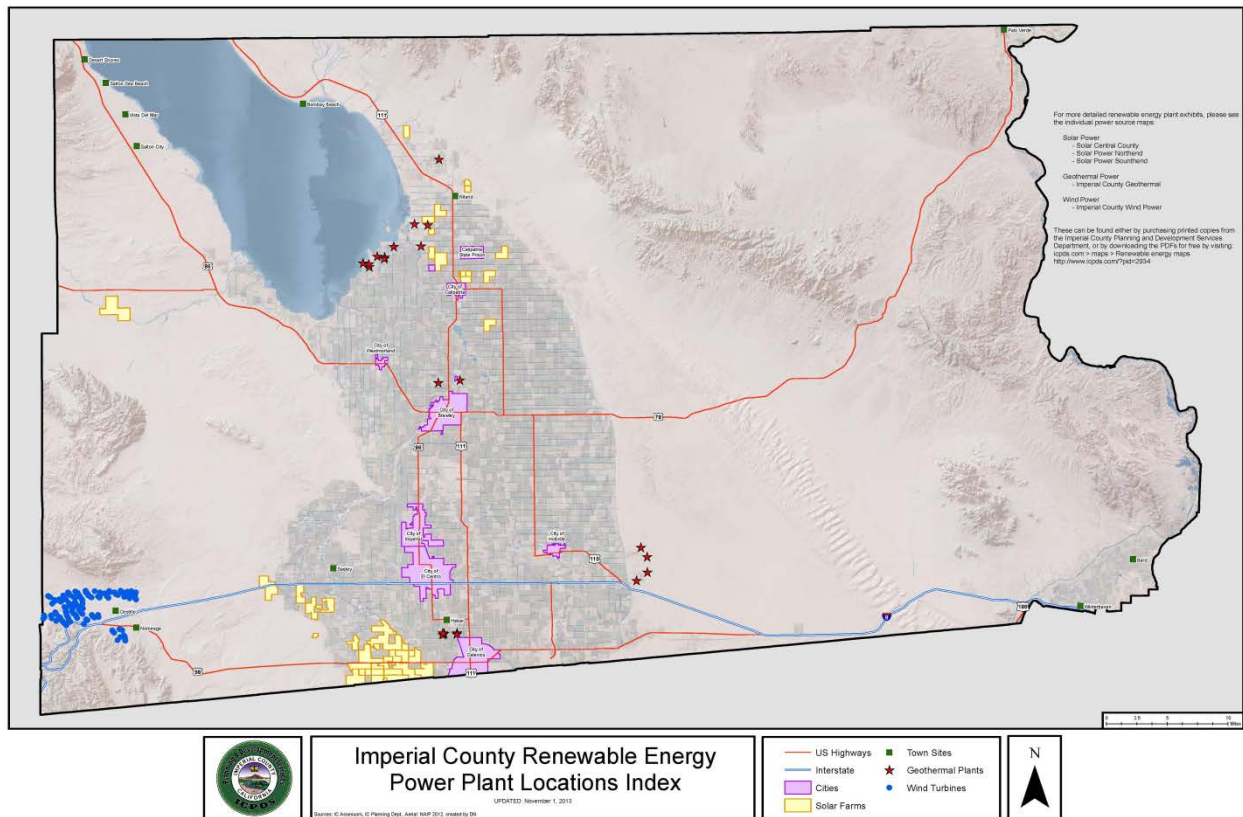


**FIGURE 5-2**  
**PERMITTED SOURCES**



**Fig 5-2:** The above map identifies those permitted sources located west, northwest and southwest of the Brawley and Calexico monitors. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States and Mexico. The green checker-boarded areas are a mixed use of agricultural and community parcels. In addition, either the Bureau of Land Management or the California Department of Parks manages the desert areas. Base map from Google Earth

**FIGURE 5-3**  
**NON-PERMITTED SOURCES**



**Fig 5-3:** The above map identifies those power sources located west, northwest and southwest of the Brawley and Callexico monitors. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

## **VI A Natural Event – A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.**

Typically, Pacific weather disturbances during this time of year will bring westerly winds. The strong gusty westerly winds on January 20, 2018 resulted from what the NWS identified as a “notable” Pacific storm that moved inland through California during the evening hours of Friday, January 19, 2018 and into Arizona by Saturday, January 20, 2018 bringing stronger onshore flow with cooling, light rain and strong gusty westerly winds into the mountains and deserts.<sup>23</sup> The strength of the gusty westerly winds were of a magnitude that prompted the NWS offices in San Diego and Phoenix to issue Urgent Weather Messages advising the public of advisory level winds in excess of 25 mph and potential gusts at or above 45 mph along mountain ridgetops and deserts.<sup>24</sup>

As the Pacific storm moved through California, dropping brief heavy snow showers in the mountains, before saturation could set in, the strong gusty westerly winds generated fugitive dust emissions from the natural mountainous areas, located to the west of Imperial County and transport those emissions into Imperial County.<sup>25</sup> Except for the El Centro monitor, all Imperial County monitors measured 24-hour averaged concentrations above 100  $\mu\text{g}/\text{m}^3$  however, the Brawley and Calexico monitors were the only monitors to exceed the  $\text{PM}_{10}$  NAAQS.

### **VI.1 Affects Air Quality**

The preamble to the revised EER states that an event is considered to have affected air quality if it can be demonstrated that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation. Given the information presented in this demonstration, particularly Section III, we can reasonably conclude that there exists a clear causal relationship between the monitored exceedance and the January 20, 2018 event, which changed or affected air quality in Imperial County.

### **VI.2 Not Reasonably Controllable or Preventable**

In order for an event to be defined as an exceptional event under section 50.1(j) of 40 CFR Part 50 an event must be “not reasonably controllable or preventable.” The revised

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<sup>23</sup> National Weather Service, Area Forecast Discussion, Jan. 19, 2018, San Diego office, 300am PST

<sup>24</sup> National Weather Service, Urgent Weather Message, Jan. 19, 2018 – Jan. 20, 2018, Phoenix office, 1250pm MST and San Diego office, 355am PST

<sup>25</sup> National Weather Service, Area Forecast Discussion, Jan. 19, 2018 & Jan. 20, 2018, San Diego office, 925pm PST & 241pm PST



preamble explains that the nRCP has two prongs, not reasonably preventable and not reasonably controllable. The nRCP is met for natural events where high wind events entrain dust from desert areas, whose sources are controlled by BACM, where human activity played little or no direct causal role. This demonstration provides evidence that the primary source areas of windblown dust transported into Imperial County came from San Diego County where Imperial County has no jurisdiction. In any event, despite BACM in place within Imperial County, high winds overwhelmed all BACM controls where human activity played little to no direct causal role. The  $PM_{10}$  exceedance measured at the Brawley and Calexico monitors were caused by naturally occurring strong gusty westerly winds that transported windblown dust into Imperial County and other parts of southern California from areas located within the Sonoran Desert regions to the west-southwest and west of Imperial County. These facts provide strong evidence that the  $PM_{10}$  exceedance at the Brawley and Calexico monitors on January 20, 2018, was not reasonably controllable or preventable.

### **VI.3 Natural Event**

The revised preamble to the EER clarifies that a "Natural Event" (50.1(k) of 40 CFR Part 50) is an event with its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. Anthropogenic sources that are reasonably controlled are considered not to play a direct role in causing emissions. As discussed within this demonstration, the  $PM_{10}$  exceedance that occurred at Brawley and Calexico on January 20, 2018, was caused by the transport of windblown dust into Imperial County by strong southerly winds associated with a storm that passed through the region. At the time of the event, anthropogenic sources, within Imperial County were reasonably controlled with BACM. The event therefore qualifies as a natural event.

### **VI.4 Clear Causal Relationship**

The comparative analysis of different meteorological sites to  $PM_{10}$  concentrations measured at the Brawley and Calexico monitors in Imperial County demonstrates a consistency of elevated gusty westerly winds with elevated concentrations of  $PM_{10}$  on January 20, 2018. In addition, temporal analysis indicates that the elevated  $PM_{10}$  concentrations and the gusty westerly winds were an event that was widespread, regional and not preventable. Days before the high wind event  $PM_{10}$  concentrations were well below the NAAQS. Although winds remained elevated the day following, moisture from the storm saturated areas to the west and northwest of Imperial County sufficiently to keep  $PM_{10}$  below the NAAQS. Overall, the demonstration provides evidence of the strong correlation between the natural event and the transported windblown dust to the exceedance on January 20, 2018.

## **VI.5 Concentration to Concentration Analysis**

The historical annual and seasonal 24-hr average PM<sub>10</sub> measured concentrations at the Brawley and Calexico monitors was outside the normal historical concentrations when compared to event and non-event days.

## **VI.6 Conclusion**

The preceding discussion, graphs, figures, and tables provide wind direction, speed and concentration data illustrating the spatial and temporal effects of the strong gusty westerly winds that preceded the identified Pacific Storm as it passed through California and into Arizona. The information provides a clear causal relationship between the entrained windblown dust and the PM<sub>10</sub> exceedance measured at the Brawley and Calexico monitors in Imperial County on January 20, 2018.

In particular, the clear causal relationship and not reasonably controllable or preventable sections provide evidence that high gusty westerly winds transported fugitive emissions from open natural Mountain and desert areas, located within San Diego County and Imperial County (all part of the Sonoran Desert). In addition, because anthropogenic sources in upwind areas were reasonably controlled at the time of the event, this event meets the definition of a Natural Event.<sup>26</sup>

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<sup>26</sup> Title 40 Code of Federal Regulations part 50: §50.1(k) Natural event means an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.